AMERICAN ARTISAN

WARM AIR HEATING • AIR CONDITIONING
SHEET METAL CONTRACTING



AIR CONDITIONING SECTION
PAGE 43

ESTABLISHED 1880

APRIL 1938

Save TIME . . . Make MONEY with LAMNECK Prefabricated Duct Systems

IT MEANS saved time and added profits for you because the use of a Lamneck System stamps you as an up-to-date dealer awake to the best in modern installation practice.

Lamneck Prefabricated Duct is engineered and manufactured to meet the most exacting requirements of present day warm air heating and air conditioning equipment. As such it is preferred by leading installers and manufacturers in the industry. Its perfected design and workmanship insure maximum efficiency, economy and attractive appearance. This is important to you because every thoroughly satisfactory installation you make leads to additional substantial business for you.

The more business you do of course, the more profit you make. But in addition Lamneck Prefabricated Duct offers you another source of increased profit. It costs you considerably less money to buy and less time to install than to make and install your own duct. Its use also shows a decided saving over any other system of prefabricated duct. This has been definitely proved by the experience of hundreds of successful Lamneck dealers.

Give us a chance to prove that you can make more money and reduce installation time with Lamneck Prefabricated Duct. WRITE us for details.



For 21 years Lamneck products have consistently held first place in the warm air heating field. Setting the pace through the years Lamneck has developed and will continue to develop the most advanced line of

TOP QUALITY
PREFABRICATED DUCT,
GRAVITY FITTINGS,
AND REGISTERS

LAMNECK PRODUCTS, INC.
414 DUBLIN AVENUE • COLUMBUS, OHIO

PREFABRICATED DUCT AND FITTINGS FOR ALL TYPES OF WARM AIR HEATING AND AIR CONDITIONING SYSTEMS



Burner Sales Are Easier

—*with* BARBER BURNERS!

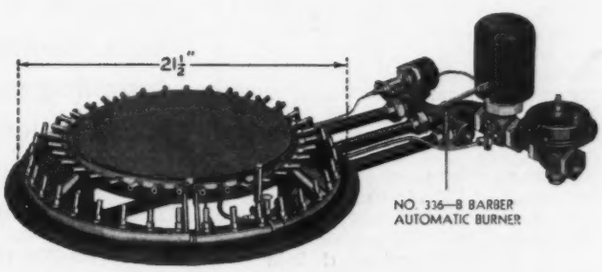
In selling a gas conversion burner to a customer, you may not get very *technical.* If you do, it's easy to demonstrate BARBER *engineering* superiority, from supply line to thermostat. It's there on the B.T.U.'s and the B.T.P.'s (Better Talking Points).

What the customer usually wants to know, however, is the *performance* record of the burner —and there again BARBER stands alone. For economy and trouble-free service, BARBER's 20-year record is unparalled. BARBER is the emblem of a responsible manufacturer, with installations running high into the thousands.

Remember *that* when you take on the responsibility of selling *any* conversion burner to the public.

•

The "B" Model shown comes in 8 sizes for round grates 12" to 34" in diameter. There is also a wide range of sizes for oblong grates. Patented BARBER Jets insure complete combustion, with a "scrubbing" flame action on walls of firebox. No fire brick or refractory elements needed. Baltimore Safety Pilot. Listed in A. G. A. Directory of Approved Appliances. Ask for Catalog and Price List on Conversion Burners for Furnaces and Boilers, Burner Units for Gas Appliances, and Gas Pressure Regulators.



•

THE BARBER GAS BURNER COMPANY

3704 Superior Avenue
Cleveland, Ohio

•

Address Michigan Inquiries to
The Barber Gas Burner Company of Michigan
4475 Cass Ave., Detroit, Michigan

BARBER *Automatic* JET GAS BURNERS

In This Issue

IN the New York City area, the firm of Herrmann and Grace has been a leader in architectural sheet metal contracting and metal fabrication for over fifty years. But the interesting feature of this shop's long history is the change in operations and products which, in turn, reflect the changes in building construction. The activities which have kept Herrmann and Grace alive for more than half a century are related on page 28.

★

Increasing attention has been paid in these issues to the problems of welding in the sheet metal shop. These problems, by the way, have not had the attention welding cast iron, for example, has had. Therefore, it has been necessary to search widely for material directly applicable to our problems. On page 36 we present "How to Tell a Good Weld," one problem we think deserves attention.

★

Lamenters for the "good old days" of the cornice and sheet metal embellishment, frequently overlook the fact that modern architecture needs badly the experience, judgment and ability of the sheet metal contractor. For example, wall flashing. The modern architect is apt to feel that masonry construction is so tight that water cannot possibly penetrate his walls. The truth is, modern thin wall construction needs flashing more than ever before. A case in point where $500 could have saved $25,000 is illustrated on page 40.

★

During the last two years we have published complete installation and licensing ordinances of Minneapolis, Minn. and Ft. Wayne, Ind. Both these codes, readers will recall, are unusually complete in all details. Beginning in this issue (page 67) we publish a simpler code (for gravity heating only) from Toledo, Ohio. Despite some incompleteness in detail, this code has exceptional applicability.

★

When the industry — and the home owner—wake up to the fact that attic ventilation, or night air cooling, can by itself provide a degree of summer comfort and, when used with mechanical cooling, reduce the load and hence the cost, this idea will go places. In southwest cities ventilation to the extent of 120 air changes per hour is gaining popularity at an astonishing rate. On page 45 we publish the first part of a field survey made last fall.

★

This coming summer, increasing attention will probably be paid to removal of pollen. Some filters do a good job—others not so good. To select just the right filter means an understanding of the physical properties of the pollens and of the filters. On page 57 we publish the first of a three-part series on pollens and filters.

AMERICAN ARTISAN

With which is merged

FURNACES AND SHEET METALS AND Warm-Air Heating

Covering All Activities in

Gravity Warm Air Heating — Forced Warm Air Heating
Sheet Metal Contracting — Ventilating
Air Conditioning

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor — Brewster S. Beach, Consulting Editor

Vol. 107, No. 4 — April, 1938 — Founded 1880

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Member of Audit Bureau of Circulations—Member Associated Business Papers, Inc.

Published monthly by Keeney Publishing Company, 6 North Michigan Ave., Chicago. Branch Offices—In New York, Room 1950, Grand Central Terminal Building, Murray Hill 2-8293; In Cleveland, 2128 Rossmoor Road, Cleveland Heights, Yellowstone 1540; In Los Angeles, J. H. Tinkham, 1406 S. Grand Ave., Richmond 6191. Copyright 1938 by Keeney Publishing Company—F. P. Keeney, President; W. J. Osborn, Vice President; R. Payne Wettstein, Secretary; Chas. E. Price, Treasurer. Advertising staff: Wallace J. Osborn, R. Payne Wettstein, Robert A. Jack, J. H. Tinkham, L. A. Doyle.

Yearly Subscription Price—U. S. and possessions, Canada, Mexico, South America, Central America, $2.00; Foreign, $4.00. Single copies, U. S. and possessions, $.25. Back numbers, $.50. January, 1938, Directory issue, $1.00 per copy. Entered as second-class matter, July 29, 1932, at the post office at Chicago, Illinois, under the act of March 3, 1879.

More than 8,000 Copies of this Issue are being distributed



The Bankers Trust Co. Building, 14 Wall St., New York, N. Y., built in 1911. All gutters and flashings on the 39 pyramid terraces are Monel. The architects, Trowbridge and Livingston; the builder, Marc Eidlitz & Son, Inc.

Collect a PROFIT *... by selling* PERMANENCE

Make lasting friends and attract more customers by using Monel for roofing jobs

Next time you quote on roofing repairs, do your customer a favor . . . and *yourself* a good turn. Suggest a replacement with Monel.* It will pay you, for this reason:

Your customers want roof troubles stopped . . . ended permanently. Give them a lastingly leak-proof job, and they'll turn many another job your way. How prove that Monel will assure that kind of a job? Cite important facts about Monel roofs:

Monel never rusts and resists corrosion from acid-laden fumes and grime. Stronger and tougher than steel, Monel expands and contracts under temperature changes far less than other roofing metals. It thus assures long life for roofs. For example: The Monel roof on New York's Penn. Station, already 27 years old, is estimated to be good for 300 *years more* . . . and Monel on the roof of the Bankers Trust Building, here illustrated, is 26 years old and still like new.

Monel is readily fabricated to form irregular contours, gutters, cap flashings and skylight frames. Write for working instructions and further information. Address:

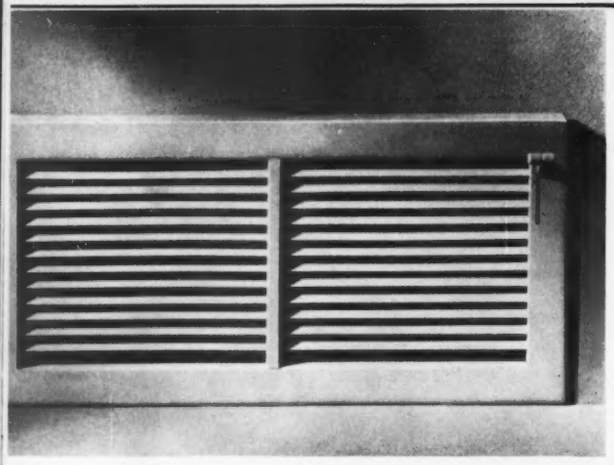
THE INTERNATIONAL NICKEL CO., INC.
67 WALL STREET NEW YORK, N. Y.

*Monel is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. This alloy is mined, smelted, refined, rolled and marketed solely by International Nickel.

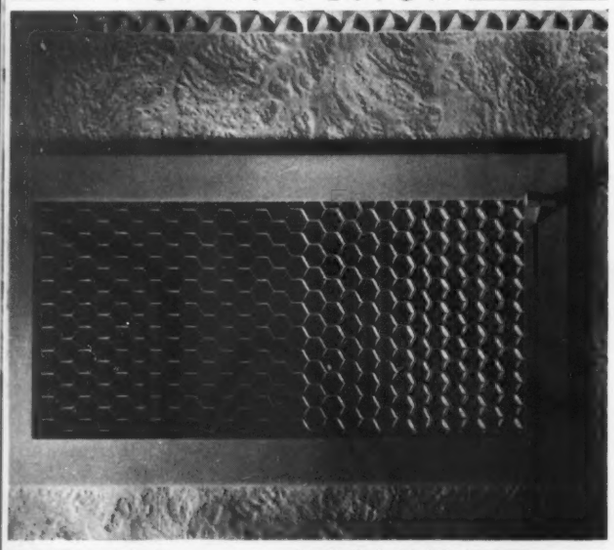
MONEL

MONEL

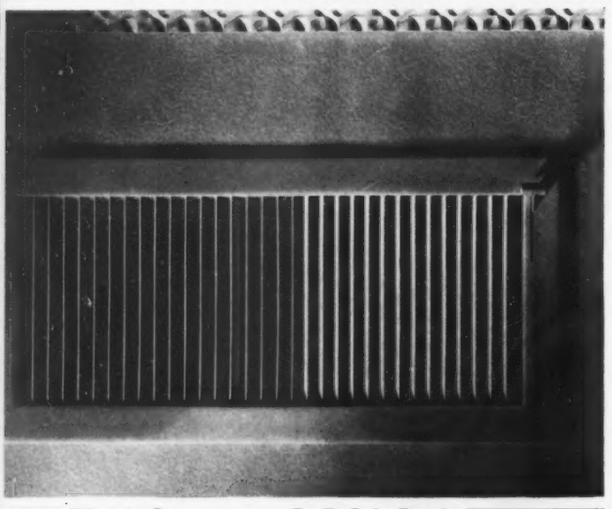
H&C Air Conditioning Grilles and Registers from The QUALITY Line



NO. 85 DESIGN



NO. 90 DESIGN



NO. 84 DESIGN

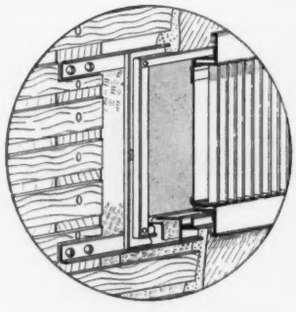
SHOWN at the left are three of the eight distinctive grille designs included in the H & C line; all available in a choice of six installation frames. If you are not thoroughly acquainted with these grilles and registers and the ideal way they fit into every installation requirement, by all means, inspect them thoroughly at your Jobbers' or write for samples. They're carefully engineered to give maximum results under all conditions; pleasing in appearance and built to the high standards that have always identified H & C as the Quality line.

No. 37 A.C. Air Conditioning Catalog sent on request.



Sponge Rubber Gasket Now Standard Without Extra Charge

on Sidewall Registers and Grilles, Design Nos. 71, 72, 76, 77, 78, 84, 85, and 90. On the low-priced No. 68 Design Sidewall Registers and Grilles, Gasket is furnished at an extra charge of 10c net per unit, regardless of size or quantity.



3-Piece Frame Assures Ideal Installation

Forms a solid foundation for Register—stackhead is held securely in place, eliminating possibility of interference with valve — plaster lock prevents plaster breaking away from frame—face overlaps frame 1/4", concealing joint between plaster and frame—sponge rubber gasket prevents streaking.

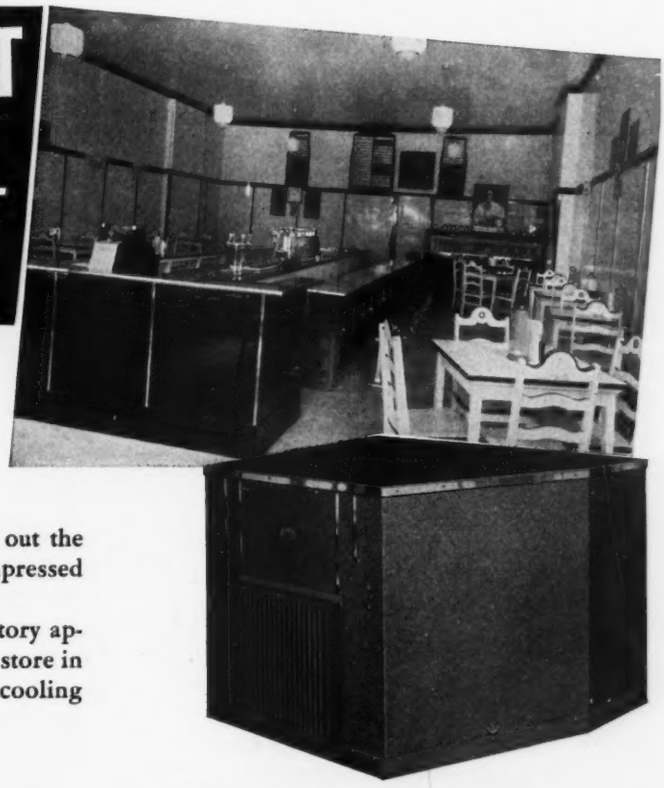
HART & COOLEY MANUFACTURING CO.

Warm Air Registers
Damper Regulator Sets
H&C
Air Conditioning Grilles
Dampers, Chain, Pulleys

61 W. KINZIE STREET, CHICAGO, ILLINOIS

ENGINEERING OFFICE AND FACTORY · HOLLAND · MICH·

There's BIG PROFIT for YOU in installations like this!



The retail store of Miller Dairy Farms at Three Rivers, Michigan, (shown here) is kept comfortable during hot weather by a USAIRCO Midget Kooler-Aire. The owners report, "We feel that you have the answer to our problem of a fresh smelling, air cooled retail store. With such a large volume of air coming out the front entrance, the prospective purchaser is first impressed with the coolness of the interior."

Many owners of small business places in your territory appreciate the trade-drawing advantage of a comfortable store in summer, are *waiting* for just such a low cost, efficient cooling and air-purifying system as is now offered in

USAIRCO Midget Kooler-aire

for Small Stores, Shops, Cafes, etc.

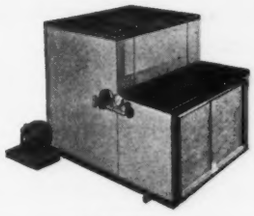
YOU can easily sell and install such jobs. No ducts required. Comes complete, fits into small space. For larger places, two or more Midget Kooler-Aire units, easily placed for uniform air distribution, offer efficient air conditioning at minimum cost!

Midget Kooler-Aire offers the same cooling efficiency enjoyed by thousands of theatres from large Kooler-Aire installations. Draws in 100% fresh air . . . washes, COOLS and circulates it, completely changing air every few minutes.

USAIRCO HOME VENTILATOR for COOLING Air Circulation



This highly efficient home attic fan, turned on in evening, expels heated stagnant air, draws in cool night air, produces refreshing air circulation throughout the home, assures sleeping comfort. Closing doors and windows in the morning assures a cool house for many hours. Made in 5 sizes — easy to install, and attractively priced.



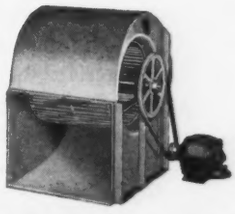
USAIRCO HOME Air Conditioner

For installation with warm air furnaces. Contains blower-filter unit and washer-humidifier unit. Four sizes.

A COMPLETE LINE

USAIRCO is the trademark of dependability in all kinds of cooling, ventilating and air conditioning equipment.

USAIRCO Light Duty Blower



For furnaces and self-contained Air Conditioners. Several arrangements available to meet different installation requirements.

Mail the Coupon

for USAIRCO catalog and our attractive territory franchise. Do it now and get in on the big profits to be made during the season now starting.

UNITED STATES AIR CONDITIONING CORPORATION
MINNEAPOLIS . . . . . MINNESOTA

New York—420 Lexington Ave. Phone Mohawk 4-0563
Chicago—543 W. Washington Blvd. Phone Dearborn 7443
In Canada—Canadian Air Conditioning Co. Ltd., Toronto, Ont.
Export Office—U.S. Air Conditioning International, Inc., 505 Fifth Ave., New York, N.Y.

UNITED STATES AIR CONDITIONING CORP.
2105 Kennedy St. N.E., Minneapolis, Minn.

Send literature on USAIRCO Equipment .....
Territory we cover .....
Name .....
Address .....
City ..... *State* .....

U. S. AIRCO DEPENDABILITY PROVED by over 6000 THEATRE and COMMERCIAL INSTALLATIONS

Zoning MAKES WARM AIR JOBS REALLY FLEXIBLE

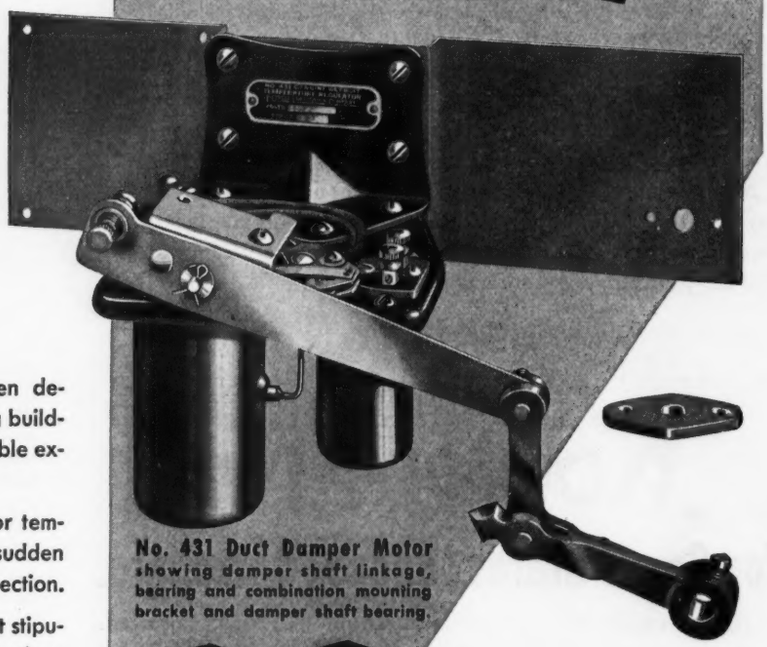
● The small additional cost of zoning a forced warm air job need hardly be considered even under rigid economy, but its advantages are worth consideration in giving that type of heating installation a flexibility and a measure of comfort not otherwise attainable. The key to zoning is the "Genuine Detroit" No. 431 Duct Damper Motor.

Using this equipment, zoning offers four important advantages:

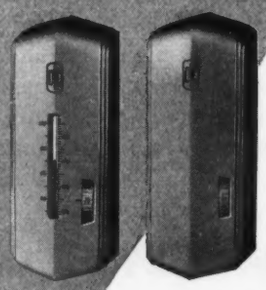
1. Assures even temperatures when desired in all sections of a rambling building or one subjected to unfavorable exposure conditions.
2. Eliminates the variation in indoor temperature normally caused by sudden changes in wind velocity and direction.
3. Makes it possible to hold different stipulated temperatures in different sections of a building.
4. Increases fuel economy through selective temperature standards.

The action of the "Genuine Detroit" No. 431 is entirely automatic, the entire heating system responding to two or more room thermostats, one for each zone. The action of this control is perfectly silent and dependable. Its quietness permits applications directly to the duct—no pivots, shafts or bearings that require servicing or oiling.

You can get further information by writing for Bulletin 66.

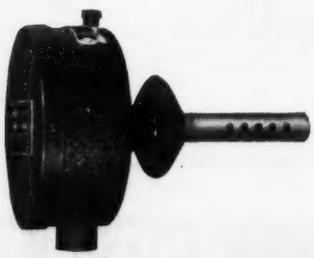


No. 431 Duct Damper Motor showing damper shaft linkage, bearing and combination mounting bracket and damper shaft bearing.



No. 211-CH Thermostat and No. 197 Humidistat. Thermostat (compensated type) operates Duct Damper Motor which in turn controls automatic burner.

No. 197 Humidistat uses sensitive Friez type hair element and matches the Thermostat with its unusually pleasing design.



No. 244 Fan Switch limits blower operation to prevent circulation of cold air. Can be adjusted to permit blower operation in summer.

DETROIT LUBRICATOR COMPANY

DETROIT, MICHIGAN, U. S. A. • 5900 TRUMBULL AVE.

NEW YORK, N. Y.—40 WEST 40th ST. • CHICAGO, ILL.—816 S. Michigan Ave.

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

Canadian Representative—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, Montreal, Toronto, Winnipeg



TONY is one of the army of genial workers who handle steel every day. He may not understand chemical analysis, but he knows the feel of good steel. That's why he smiles when he sees the familiar U·S·S trademark.

Workers' smiles are worth dollars and cents to you. They mean that production is flowing smoothly—that the steel has proper qualities for forming, welding, cutting, punching—that more pieces will be finished when the whistle blows at the end of the day.

For ice cans, racks and other equipment that must withstand corrosion, U·S·S Galvanized Sheets are the standard. They do not crack or flake when fabricated and offer many years of low-cost service. Where corrosive conditions are severe, Galvanized Copper Steel is recommended because of its higher resistance to rust.

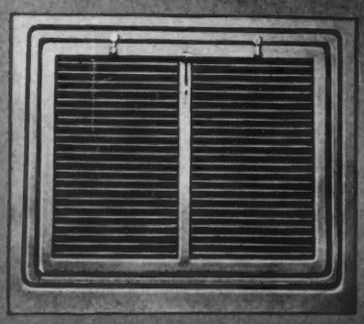
U·S·S BLACK *and* GALVANIZED STEEL SHEETS

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*

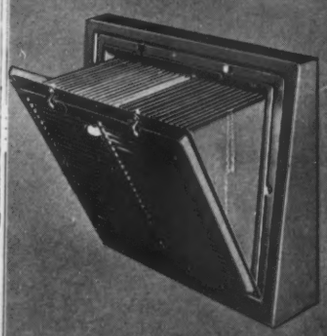
Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

Lower installation costs with "All Season" Combination Air Conditioning Wall Register



No. 650 SERIES
Winter Heating
Position



No. 650 SERIES
Summer Cooling
Position

No. 650 Series
BASEBOARD REPLACEMENT TYPE

A COMBINATION WARM and COOL air conditioning register, engineered and designed for the replacement or change-over air conditioning and ventilating installations in the LARGE EXISTING-HOME MARKET. Installation costs reduced to an absolute minimum on new or change-over jobs.

Saves cutting into side walls—allows for use of existing duct systems with no changes or addition.

Both the 650 Series and 700 Series have INDIVIDUAL ADJUSTABLE grille bars in the top opening or summer cooling position to provide easily and quickly any air deflection required. The grille bars in the warm air face are firmly set at 22° DOWNWARD ANGLE to provide distribution of warm air down and across the floor in a uniform flow.

No. 700 Series
FLUSH WALL TYPE

The new No. 700 series "All Season" Combination Register sets a new and revolutionary standard in design and performance of an air conditioning register to be used on new home installations.

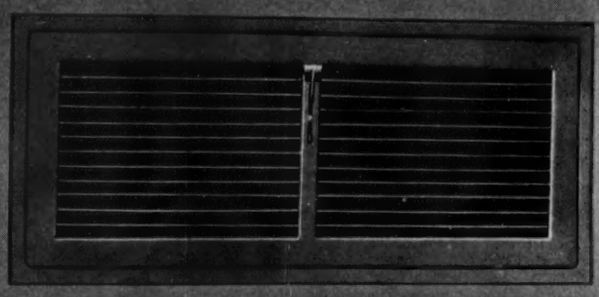
They meet architects' preference and engineers' specifications for ONE register that will ADEQUATELY and PROPERLY distribute both warm and cool air from near or at the baseboard.

They not only reduce installation costs, but also eliminate objectionable drafts in the living zone of a room.

Cool air can be properly introduced without the necessity of marring the upper or visual surface of the beautiful and finely decorated wall.

The 700 series consists of combination warm and cool air grille, flush wall register frame and seal-tite installation (plaster) rough-in frame.

Ask your Jobber or write for Catalogue D-4

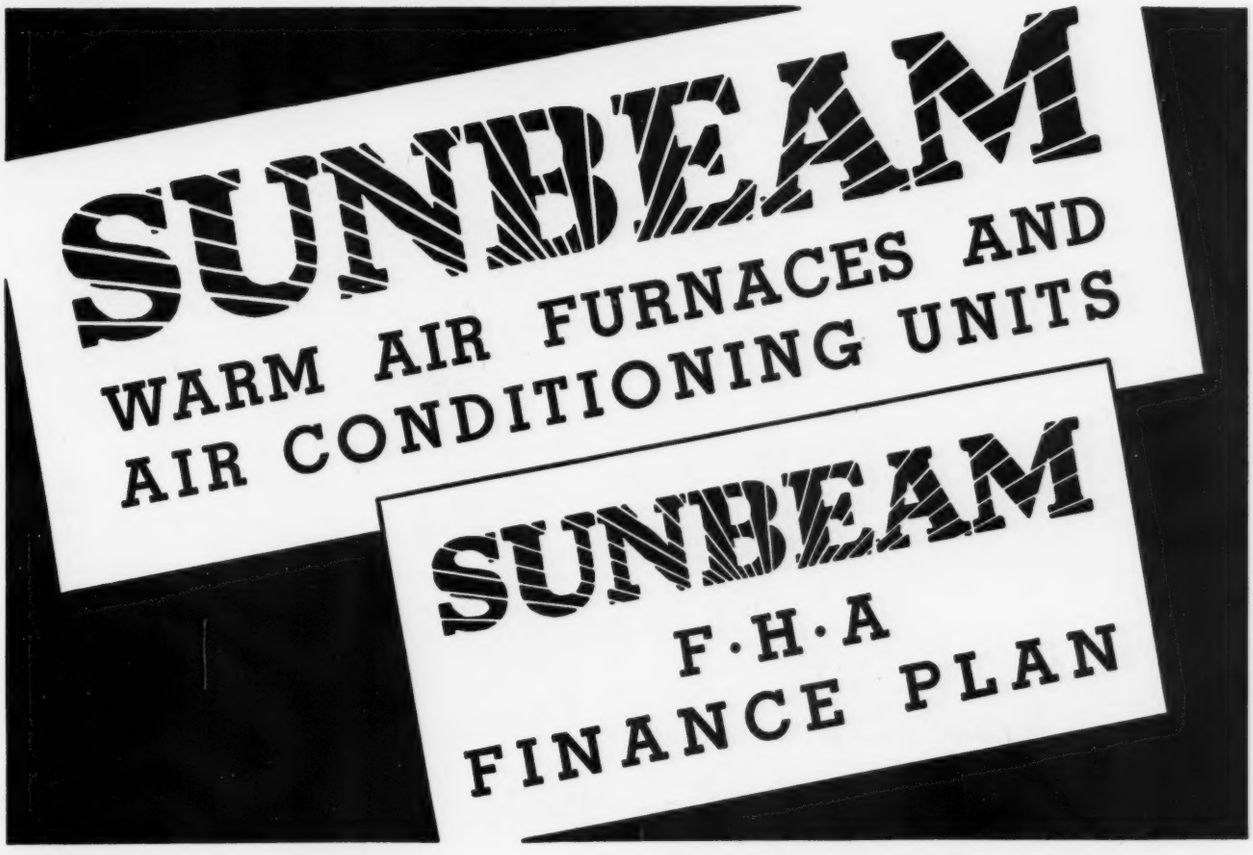


No. 700 SERIES
Winter Heating Position



No. 700 SERIES
Summer Cooling Position

ECKENROTH REGISTER CO. INC.
447 SUTTER ST. SAN FRANCISCO, CALIF.



"Signs that Sell!"

USE THEM BOTH FOR INCREASING SALES

Right along with Sunbeam's new low prices comes the new Sunbeam-FHA Financing Plan . . . the greatest replacement selling tool ever offered furnace and air conditioning dealers. Check for yourself all its advantages listed here. Then send the coupon for our booklet, "The Better Finance Plan," that explains all details. Here's your opportunity for more sales when your prospects hear how little it now costs to modernize.

Advantages to You

1. No financial statement required
2. Endorse notes without recourse
3. Full payment on completion of job
4. Free credit investigations
5. No collection charges
6. No legal expenses
7. Fast action on all applications

Advantages to the Home Owner

1. No down payment required
2. As long as three years to pay
3. Monthly payments as low as $10
4. One simple form to fill out
5. 5% financing rate (lowest ever)

MAIL COUPON FOR DETAILS

The Fox Furnace Co.,
Elyria, Ohio

Please send me your booklet "The Better Finance Plan" about new Sunbeam-FHA Financing. Also send me the name of the nearby Sunbeam Jobber.

Name_____

Address_____

City and State_____

AA-4-38

THE FOX FURNACE CO. • ELYRIA, OHIO

• A DIVISION OF AMERICAN RADIATOR AND STANDARD SANITARY CORPORATION •





Sheet metal distributor finds ECONOMY Copper Roofing ideal for his own home

"Certainly am pleased with beautiful, lightweight Copper Roof," writes John H. Maxwell of Fort Worth.

The president of the Maxwell Steel Co., prominent sheet metal distributors of Fort Worth, Texas, finds that Anaconda *Economy* Copper Roofing is not only one of his best selling lines . . . he has recently installed it on his own home. Says Mr. Maxwell:

"I certainly am pleased with your beautiful, lightweight copper roof. We had a tremendously hot summer in 1937 and I am glad to report that this copper roof was much cooler than other types of roof that will hold the heat in Texas sometimes after midnight. Anaconda Copper will cool off in 15 minutes after the sun goes down . . . And we haven't had a leak in the building since it was put on. I'm convinced there's nothing like this roof for appearance, service, durability and economy through the years."

Because it has *everything* the homeowner wants in a roof . . . Anaconda *Economy* Copper Roofing is winning nation-wide acceptance. That is why you can sell it — why it offers sheet metal men a new opportunity to get profitable residential roofing business. Read at right the advantages offered by no other roofing material . . . and use these advantages as selling points!

Important Advantages of Anaconda **Economy** *Copper Roofing*

1. APPEARANCE . . . Copper increases in beauty with age and service.

2. DURABILITY... Permanent in spite of time and weather.

3. FIREPROOF...Copper roofs eliminate flying spark hazard . . . earn lower insurance.

4. LIGHT WEIGHT makes costly supporting structure unnecessary.

5. PROTECTS INSULATION from damaging water or moisture.

38J19

ANACONDA from mine to consumer

Anaconda Copper

THE AMERICAN BRASS COMPANY · GENERAL OFFICES: WATERBURY, CONNECTICUT

Offices and Agencies in Principal Cities · In Canada: ANACONDA AMERICAN BRASS LTD., New Toronto, Ontario



It's Easy FOR THIS MOTOR TO WALK AWAY WITH THE LOAD!

Refrigeration Compressors

This summer you're going to sell a lot of Air Conditioning equipment... It's going to be a grand chance to make money—IF you use the right motor for driving refrigeration compressors, so widely used in Air Conditioning jobs.

When selecting the motor it's easy to be sure you're right! Take a money-making tip from Designers and Engineers of the leading Air Conditioning equipment manufacturers in the country . . . They know all the job requirements . . . They have tested Century Motors under the most severe operating conditions imaginable... They have found that Century Motors WILL:

(1) Start the heaviest loads—QUIETLY...
(2) Bring them up to speed—QUIETLY...
(3) Keep them running—QUIETLY.

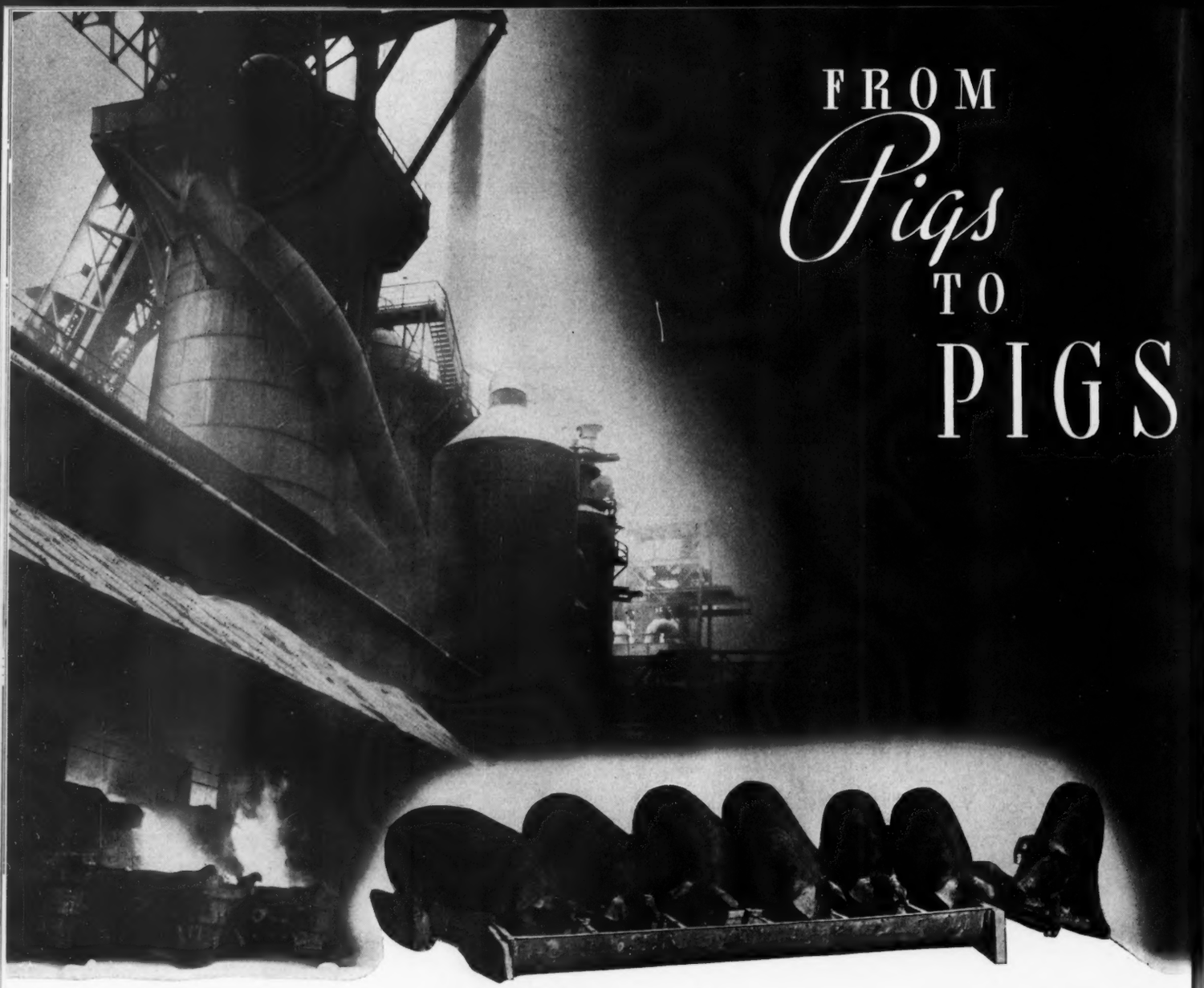
TEST A CENTURY—
BE SURE YOU'RE RIGHT

Assure yourself that the profit you make on Air Conditioning installations will not be "frittered" away in annoying service calls that can be avoided when you supply Century Motors.

Get action on your motor problems! Write our general office or one of our branch offices—conveniently located in principal cities.

CENTURY ELECTRIC COMPANY
1806 Pine Street St. Louis, Missouri
Offices and Stock Points in Principal Cities

Century MOTORS
SIZES UP TO 600 HORSE POWER



FROM *Pigs* TO PIGS

★"Modern" applies today to farms as well as cities--and *steel* has made this true. A sizeable percentage of the "pigs" (masses of metal cast in a mold) from all blast furnaces find their way to the farms in the form of steel---in plows and in modern equipment which increases production; granaries that protect the harvest; pipe, pumps and troughs by which animals are fed and watered.

On an average farm are hundreds of uses for steel. Look around your home--whether farm or city--and note how much you, too, depend on steel --hinges, stoves, cooking utensils, refrigerator, plumbing, heating and countless other uses.

Not, of course, just any steel. There are actually thousands of kinds of steel, and we have spent years and millions of dollars to equip ourselves to work with you, to find which will exactly meet your needs. No matter how small the order may be every Youngstown resource for quality is employed in its production.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon and Alloy Steels
General Offices - YOUNGSTOWN, OHIO

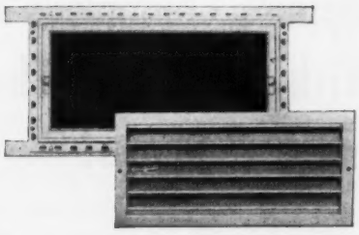
QUALITY YOUNGSTOWN SERVICE

Sheets - Plates - Pipe and Tubular Products - Conduit Tin Plate - Bars - Rods - Wire - Nails - Unions - Tie Plates and Spikes.

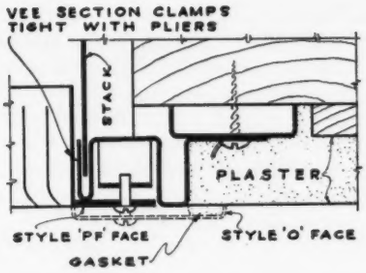
25-6A

YOUNGSTOWN

WATERLOO
Air Conditioning
REGISTERS



FH-100 with Vee—U Frame. Adjustable one-piece register for walls (patented).



New Features That SELL

■ Dealers—reach out for a bigger market, and bigger PROFITS, with the new 1938 Waterloo Air Conditioning Registers. This new 4-way MATCHED line of registers includes—wall and baseboard registers, baseboard and flat return intakes—permitting uniform, custom-matched installations at STANDARD prices. Other selling advantages you have with the Waterloo line include: Complete adjustable control of air-flow (90-degree range)—Positive locking of louvres in any position—Slanted louvres that reflect light, conceal ducts, yet provide maximum free area.

These are just a few of the Waterloo features that will help YOU to greater business and profits in 1938. Write for new Waterloo Catalog giving complete details on these new matched designs, with illustrations, charts and full installation data.

Write for your free catalog today

WATERLOO REGISTER CO.
Waterloo, Iowa **Seattle, Wash.**

In New York City: Air Conditioning Utilities Co., 8 West 40th St.
In Los Angeles: California-Waterloo Register Co., 785 Clanton St.

Floor Registers—Floor Cold Air Faces—Wall Registers—Baseboard Gravity Registers—Steel Grilles—Oak Wood Faces and all Furnace Supplies

"JUST WHAT I NEEDED FOR THE SMALL HOME MARKET"



Specifications Model 100 E. ***Capacity at bonnet 72,000 B. t. u.'s. Capacity at registers, 65,000 B. t. u.'s. Automatic synchronized high-low control of burner and blower. Automatic humidification. Filters. Efficiency of 80% plus achieved by new longer flue travel. Width 26¼". Length 50¼". Height 53¾". Shipped assembled.***

•

The new F. H. A. insured modernization loans and the new F. H. A. insured building loans are creating prospects for Superfex NOW.

The Superfex Model 100 E— Supplies Continuous Air Flow With Less Fuel Than *"off and on"* Plants!

"Some of us sheet metal contractors and furnace dealers have made the mistake of thinking that air conditioning is beyond the means of the average small home builder. *We have been dead wrong.* The SUPERFEX Model 100 E costs very little more than an ordinary heating plant."

Like bigger SUPERFEX models, the 100 E operates on "high-low" control instead of the old "off and on" system. It filters, heats, humidifies and circulates air continuously. There is no noticeable stratification or discomfort in the "LEG ZONE" because cold air at the floor is picked up and mixed with warmer air by the continuous currents from the SUPERFEX plant. The result is real 24 hour air conditioning—not just the average 8. And the SUPERFEX actually produces this continuous, healthful comfort *on less fuel than is consumed by intermittent systems.*

The upswing in small home building is already under way. As a SUPERFEX dealer, you will be in the key position to get new business. You will have a time-proved model which meets cost and performance requirements of the small home. You will have a line of three models with capacity at the registers from 65,000 to 140,000 B.t.u.'s. Send the coupon *now* for our catalog, prices and details of franchise.

PERFECTION STOVE COMPANY
7900-D Platt Ave., Cleveland, Ohio

Send me full details of the SUPERFEX Warm Air Conditioner including Model 100 E.

Name_____

Street_____

City_____ State_____

The Mark of Quality

SUPERFEX

WARM AIR CONDITIONER



HERE'S A HANDY DIRECTORY OF *Armco Distributors*

A telephone call to the nearest Armco distributor will bring you quick delivery of Armco sheet metals. Names marked with an asterisk (*) supply ARMCO Stainless Steel Sheets; double asterisk (**) stainless steel as well as ARMCO Ingot Iron, galvanized, PAINTGRIP and hot rolled grades. Those not marked supply all grades except stainless steel. The American Rolling Mill Co., Executive Offices, 1380 Curtis St., Middletown, Ohio.

ALABAMA
Birmingham.....**The Geo. F. Wheelock Co.
Mobile.....Turner Supply Co.

ARKANSAS
Fort Smith.....Hammond Sheet Metal Co.

CALIFORNIA
Fresno.....Tay-Holbrook, Inc.
Los Angeles.....California Hardware Co.
Los Angeles.....A. M. Castle & Co.
Oakland.....A. M. Castle & Co.
Oakland.....Tay-Holbrook, Inc.
Sacramento.....Tay-Holbrook, Inc.
San Francisco.....A. M. Castle & Co.
San Francisco.....Tay-Holbrook, Inc.
San Jose.....Tay-Holbrook, Inc.

COLORADO
Denver.....C. A. Crosta, Inc.

CONNECTICUT
Bridgeport.....**The Chapin & Bangs Co.
Hartford.....**The Blodgett & Clapp Co.
New Haven.....The C. S. Mersick & Co.
Waterbury.....Henry Weyand Co., Inc.

DISTRICT OF COLUMBIA
Washington.....**York Corrugating Co.

FLORIDA
Jacksonville.....**Horne-Wilson, Inc.
Miami.....**Horne-Wilson, Inc.
Tampa.....**Horne-Wilson, Inc.

GEORGIA
Atlanta.....**Conklin Tin Plate & Metal Co.
Savannah.....Conklin Tin Plate & Metal Co.

ILLINOIS
Chicago.....A. M. Castle & Co.
Chicago.....**Central Steel & Wire Co.
Chicago.....Milcor Steel Co.
Chicago.....Jos. T. Ryerson & Son, Inc.
Chicago.....Benjamin Wolff & Co.
Peoria.....Ceco Steel & Wire Products
Peoria.....Sheet Metal Products Co.
Rockford.....**America Heating & Supply Co.

INDIANA
Hammond.....W. J. Holliday & Co.
Indianapolis.....**W. J. Holliday & Co.
South Bend.....The Ometco Supply Co.
Terre Haute.....Braden Mfg. Co.

IOWA
Cedar Rapids.....Harper & McIntire Co.
Des Moines.....Luthe Hardware Co.
Dubuque.....Klauer Mfg. Co.
Ottumwa.....Harper & McIntire Co.

KENTUCKY
Ashland.....Ben Williamson & Co.
Louisville.....Conner Mfg. Co.
Louisville.....*Niell-LaVielle Supply Co.

LOUISIANA
New Orleans.....**Orleans Steel Products Co.
Shreveport.....*Pelican Well Tool & Supply Co.

MAINE
Bangor.....Wood & Bishop Co.
Lewiston.....Brown-Wales Co.
Portland.....E. Corey & Co.

MARYLAND
Baltimore.....**Arnold & Co.

MASSACHUSETTS
Boston.....**Brown-Wales Co.
Boston.....A. C. Harvey Co.
Boston.....M. A. Peacard & Co.
Cambridge.....*Industrial Steels, Inc.
Cambridge.....Lamb & Ritchie Company
Fall River.....**The Congdon & Carpenter Co.
Springfield.....**Warren F. Hoye, Inc.
Worcester.....*Bancroft Steel Co.
Worcester.....George F. Blake, Inc.

MICHIGAN
Detroit.....*Copper & Brass Sales Co.
Detroit.....**J. M. & L. A. Osborn Co.
Detroit.....Jos. T. Ryerson & Son, Inc.
Grand Rapids.....W. C. Hopson Co.
Saginaw.....Morley Brothers

MINNESOTA
Minneapolis.....Farwell, Ozmun, Kirk & Co.
St. Paul.....Farwell, Ozmun, Kirk & Co.

MISSOURI
Kansas City.....*Metal Goods Corp.
Kansas City.....Milcor Steel Co.
Kansas City.....**Richards & Conover Hdwe. Co.
St. Louis.....Hammond Sheet Metal Co.
St. Louis.....*Metal Goods Corp.
St. Louis.....Jos. T. Ryerson & Son, Inc.
St. Louis.....Sligo Iron Store Co.
St. Louis.....**E. E. Souther Iron Co.

NEBRASKA
Omaha.....**Ceco Steel & Wire Products
Omaha.....U. S. Supply Co.

NEW JERSEY
Jersey City.....Berger Brothers Co.
Jersey City.....Jos. T. Ryerson & Son, Inc.
Jersey City.....York Corrugating Co.
Newark.....Bayonne Steel Products Co.
Newark.....*Edgcomb Steel Corp.
Newark.....Mapes & Sprowl Steel Co.
Newark.....York Corrugating Co.
Paterson.....York Corrugating Co.

NEW YORK
Albany.....Albany Steel & Iron Supply Co.
Albany.....James Ackroyd & Sons, Inc.
Buffalo.....*Brace-Mueller-Huntley, Inc.
Buffalo.....**J. M. & L. A. Osborn Co.
Buffalo.....Jos. T. Ryerson & Son, Inc.
Long Island City.....Egleston Brothers Co.
New York City.....*H. Boker & Co., Inc.
New York City.....Bruce & Cook, Inc.
New York City.....**George A. Feld Co.
Ogdensburg.....Utica Plumbing & Supply Co.
Rochester.....**Brace-Mueller-Huntley, Inc.
Rochester.....**Follansbee Brothers Co.
Syracuse.....*Brace-Mueller-Huntley, Inc.
Syracuse.....Syracuse Supply Co.
Utica.....Utica Plumbing & Supply Co.

NORTH CAROLINA
Charlotte.....**Horne-Wilson, Inc.
Greensboro.....*Carolina Steel & Iron Co.

OHIO
Cincinnati..Cincinnati Sheet Metal & Roofing Co.
Cincinnati.....*The Edwards Mfg. Co., Inc.
Cincinnati.....Jos. T. Ryerson & Son, Inc.
Cleveland.....**J. M. & L. A. Osborn Co.
Cleveland.....Jos. T. Ryerson & Son, Inc.
Columbus.....**F. O. Schoedinger Co.
Columbus.....Vorys Brothers, Inc.
Dayton.....*Central Steel & Wire Co.
Dayton.....Ohio Metal & Mfg. Co.
Toledo.....**C. F. Throm & Sons Co.

OKLAHOMA
Oklahoma City.**Richards & Conover Hdwe. Co.

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PENNSYLVANIA
Harrisburg.....York Corrugating Co.
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Scranton.....Bittenbender Co., Inc.
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RHODE ISLAND
Providence.....**Congdon & Carpenter Co.

SOUTH DAKOTA
Sioux Falls.....Larson Hardware Co.

TENNESSEE
Chattanooga.....Vance Iron & Steel Co.
Knoxville.....**C. M. McClung & Co.
Memphis.....**Pidgeon-Thomas Iron Co.
Nashville.....**Phillips & Buttorff Mfg. Co.

TEXAS
Brownsville.....**Alamo Iron Works
Corpus Christi.....**Alamo Iron Works
Dallas.....*Huey & Philp Hardware Co.
Dallas.....**Moncrief-Lenoir Mfg. Co.
Fort Worth.....**Maxwell Steel Co.
Fort Worth.....**Moncrief-Lenoir Mfg. Co.
Houston.....Moncrief-Lenoir Mfg. Co.
Lubbock.....Moncrief-Lenoir Mfg. Co.
San Antonio.....Moncrief-Lenoir Mfg. Co.

UTAH
Ogden.....George A. Lowe Co.

VERMONT
St. Albans.....Geo. H. Soule Co.

VIRGINIA
Lynchburg.....*N. B. Handy Co.
Norfolk.....Empire Machinery & Supply Co.
Richmond.....**Gordon Metal Co.

WASHINGTON
Seattle.....A. M. Castle & Co.

WEST VIRGINIA
Huntington.....Banks-Miller Supply Co.
Williamson.....Williamson Supply Co.

WISCONSIN
LaCrosse.....Milcor Steel Co.
Milwaukee.....Milcor Steel Co.
Milwaukee.....**Shadbolt & Boyd Co.

CANADA
Toronto.....*Ajax Distributing Co., Ltd.
Toronto.....Peckover's, Ltd.
Vancouver, B. C.....*McLennen & Prior, Ltd.

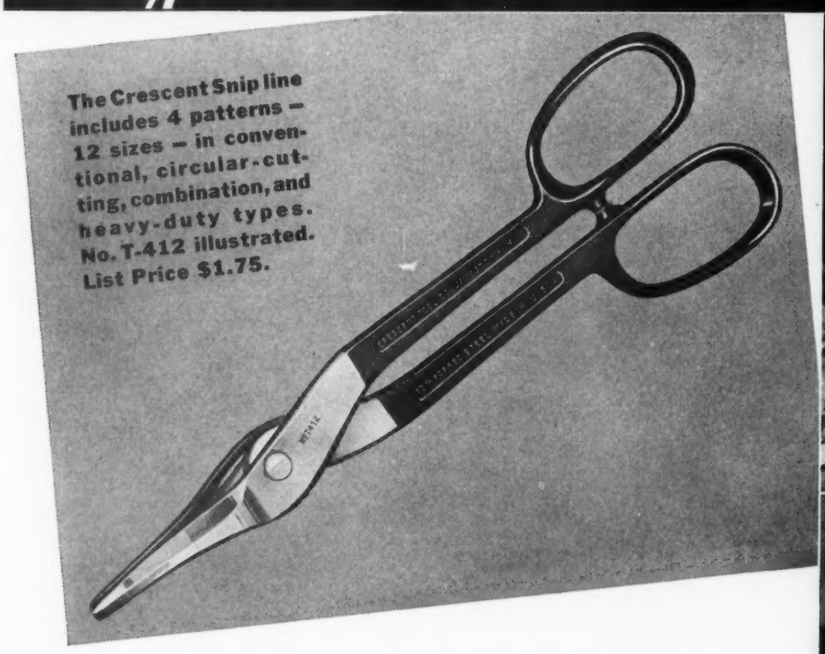
ARMCO

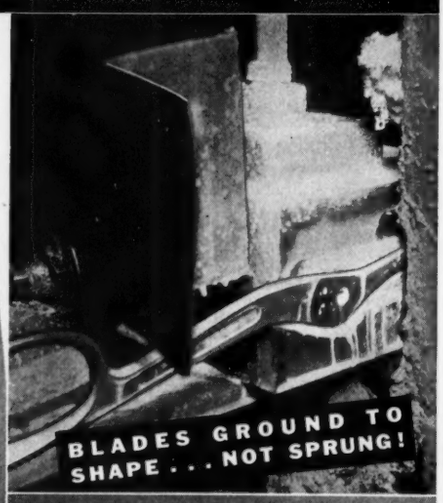
USE *Armco* SHEET METALS

PRINTED IN U.S.A.

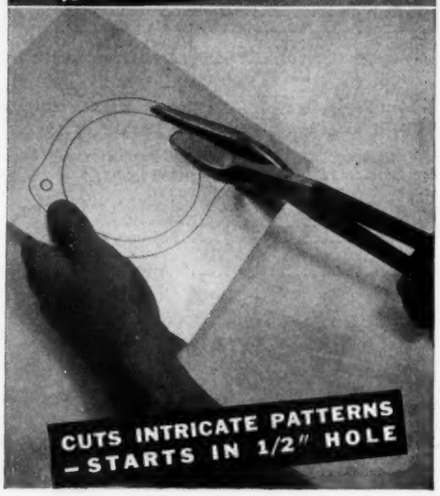
NUMBER TWO IN A SERIES OF THREE ADVERTISEMENTS EXPLAINING

Why CRESCENT SNIPS ARE SUPERIOR!









Cutting ability **is the all-important thing in any snip . . . and it's the one feature that impresses you most in every Crescent Snip, regardless of pattern.**

There are very definite reasons why Crescent Snips cut easier and cleaner. For one thing, Crescent blades are *not sprung* to give them the necessary tension for clean shearing — but are ground to permanent shape from the solid forging. And another thing Crescent designers did was to first find the most effective shearing angle, and then design a blade contour which would maintain that angle at all times throughout the cutting stroke.

You have only to try a pair of Crescent Snips to realize the importance of these fine features of Crescent design. Whatever your requirements, there is a Crescent Pattern to fill the bill: Conventional types for straight cutting; Heavy-Duty and Combination types; and the Circular-Cutting Pattern illustrated in action at the right. All are fully guaranteed.

CRESCENT TOOL CO., JAMESTOWN, N. Y.

MEET THE CHANEY BOYS OF FREMONT, OHIO



CHANEY BROTHERS

What they did in two years suggests how

YOU MAY MAKE MORE MONEY IN THE FURNACE BUSINESS

The Chaney boys, Joe and Floyd, are topnotch mechanics. They know a good thing when it comes along. When they saw the Williamson "Tripl-ife" Furnace, studied its construction and new automatic features and the amazing 20-year guaranty, they knew that this was the kind of heating plant, with the kind of backing people wanted and would buy. They made no claims to being salesmen. But this didn't hold them back. They jumped in and went after business.

Soon everybody in and around Fremont knew the Chaneys and knew all about the Williamson "Tripl-ife." They made a good living the first year. The second year they made the sales records of many old-time furnace men look awfully weak. Now they are owners of the Chaney-Williamson Furnace Company—have a prosperous, growing business.

There are any number of earnest, enthusiastic men, like the Chaney Boys, who can establish themselves for life, with the Williamson "Tripl-ife." And there are many already in the business who can double and treble their profits with this demonstrated money-maker.

THEY SOLD

1. A 20-year written Guaranty
2. Automatic built-in Heat Control
3. Automatic Humidifier
4. Dependable Heat

And they WENT TO TOWN



The Williamson "Tripl-ife" is the biggest furnace BUY on the market. STANDARD EQUIPMENT INCLUDES: Built-in Heat Control which regulates draft dampers through action of heat in furnace. No electric current or delicate mechanism. Automatic Humidifier and other advanced features. Castings made of "Tripl-ife" Iron, a new iron alloy which makes possible the "Tripl-ife" 20-year written guaranty against burnout of any castings. No "Mileage" reservations.

If you are looking for the furnace money-maker of all time, here it is. Write today for all the details.

THE WILLIAMSON HEATER COMPANY

"Over 50 Years of Service"

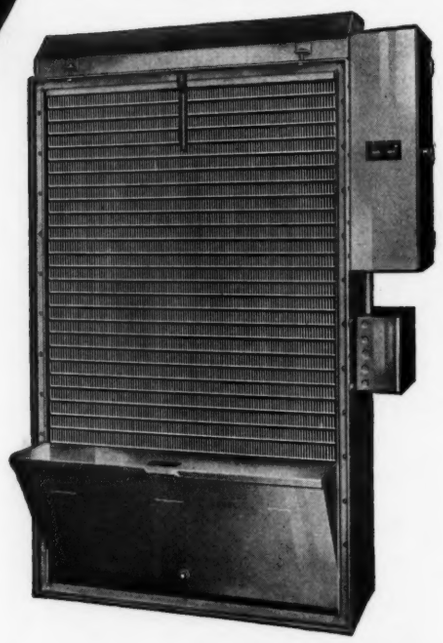
CINCINNATI, OHIO

WILLIAMSON TRIPL-IFE FURNACES

THE GREATEST IMPROVEMENT IN AUTOMATIC AIR FILTERS SINCE THE INTRODUCTION OF THE SELF-CLEANING PRINCIPLE



The graduated construction of the new Armored Multi-Panel Filter makes possible the efficient collection of dust and dirt having a wide range of particle sizes and materially increases the dust holding capacity of the filter by distributing the dust load more uniformly through the depth of the filter. Also with graduated media the operating resistance of the filter is much lower since a longer time is required to build up a dust deposit at any point sufficient to restrict the air passage.



The Armored Multi-Panel Air Filter incorporates for the first time a filter media of graduated density in an automatic filter of the curtain type. The Armored die stamped portion (1) provides ample storage for lint and coarse bulky dust without restricting air flow. The bare woven screen portion (2) is the intermediate stage, and the Bakelite coated screen (3) the final high efficiency stage. Write for bulletin 240-C.

AMERICAN AIR FILTER CO., INC.

INCORPORATED
102 Central Ave., Louisville, Kentucky
In Canada: Darling Bros., Ltd., Montreal, P. Q.

Multi-ARMORED-Panel

WEIR-MEYER

THE COMPLETE *ALL-FUEL* LINES THAT MEAN SALES PLUS DEALER-PROTECTION



Not only does this company offer its dealers a complete line of warm-air and air-conditioning units for coal, oil, and gas, and not only is the line so complete that dealers can either "meet competition" or meet the most exacting quality demands, but, in addition, this company, backed by more than fifty years of fair dealing, guarantees every dealer positive protection in his territory and greater co-operation.

If this is the kind of line and company you would like to be associated with, clip the coupon today.

THE MEYER FURNACE COMPANY

PEORIA, ILLINOIS

Established 1866

Manufacturers of

WEIR AND MEYER STEEL FURNACES AND DOMESTIC AIR CONDITIONING APPLIANCES

"WHO MAKES IT MAKES A DIFFERENCE"

THE MEYER FURNACE COMPANY · WEIR · MEYER · PEORIA, ILLINOIS

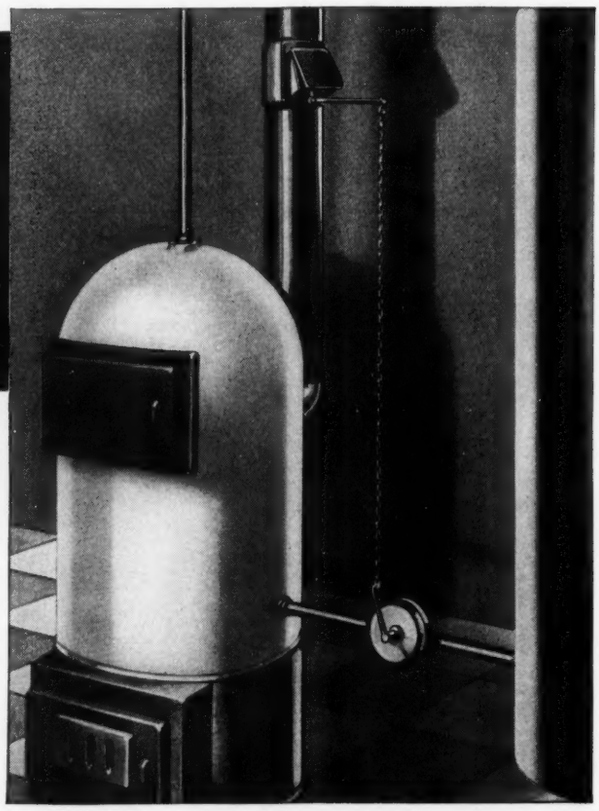
(Sign—or clip to your letterhead)

The Meyer Furnace Company, Peoria, Ill.
Send the details of your dealer franchise.

.....

NEW SPRING BUSINESS AND NEW CUSTOMERS

Thousands Now Replacing Extravagant Gas Heaters *with* ANTHRACITE WATER HEATERS



YOUR CUSTOMERS and prospects are eager for savings on hot water bills. They are especially eager when you tell them how to get constant hot water at ⅓ the cost of gas.

Sell modern Anthracite Water Heaters with automatic regulators and you will immediately open up a vast new market. You will multiply new customers as news of this low-cost equipment spreads from home to home. Introduce it in homes that now use gas or other expensive fuels for water heating. Also introduce it in homes with old-fashioned coal heaters and those with no hot water supply at all.

The market is big. New Anthracite equipment is so inexpensive that every home owner can afford it. Modern regulators adjust drafts automatically and eliminate all manual attention to temperature control. Hot water is always on tap.

Prepare for increased spring and summer business.

ANTHRACITE INDUSTRIES, INC.
Chrysler Building, New York, N. Y.

AUTOMATIC REGULATORS

You have an additional opportunity in homes already using Anthracite Water Heaters. Sell and install automatic regulators to give temperature control without manual attention. Sales of regulators will add new customers who will be good prospects for other Anthracite equipment you sell.

Water Heater Regulators approved by Anthracite Industries' Laboratory are manufactured by:

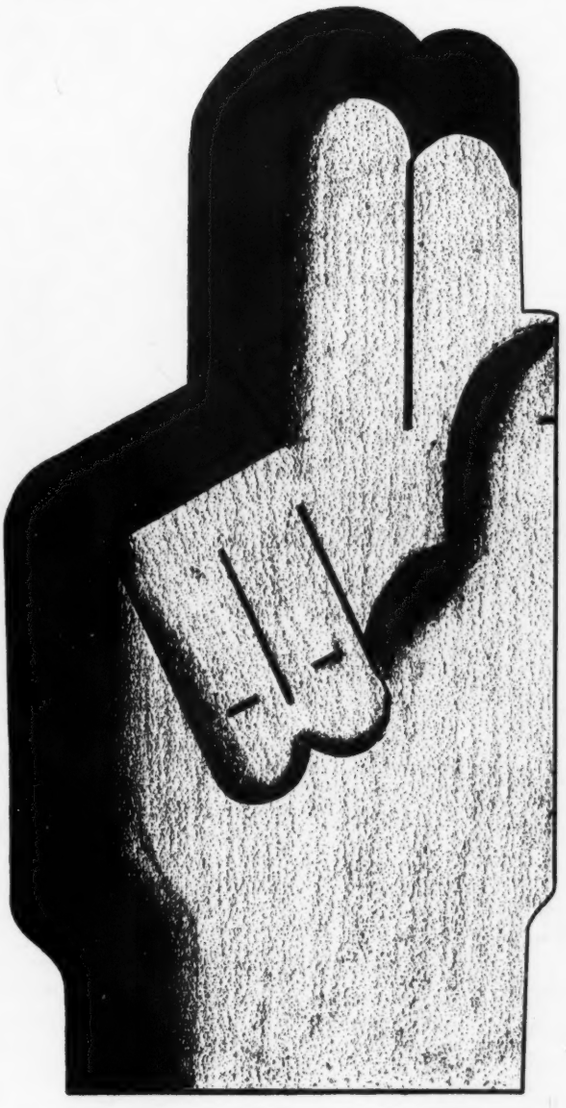
American Radiator Co. . 40 West 40th St., New York
Fulton Sylphon Company . . . Knoxville, Tenn.
E. J. Deegan Mfg. Co. . 291 E. 134th St., New York
James Regulator Company . . . Pottsville, Pa.
National Regulator Co. . 2317 Knox Ave., Chicago

ANTHRACITE INDUSTRIES approved INCORPORATED

This Seal of Approval appears on Anthracite equipment only after it has passed the most rigid tests in the heating field.



Pennsylvania
ANTHRACITE WATER HEATERS

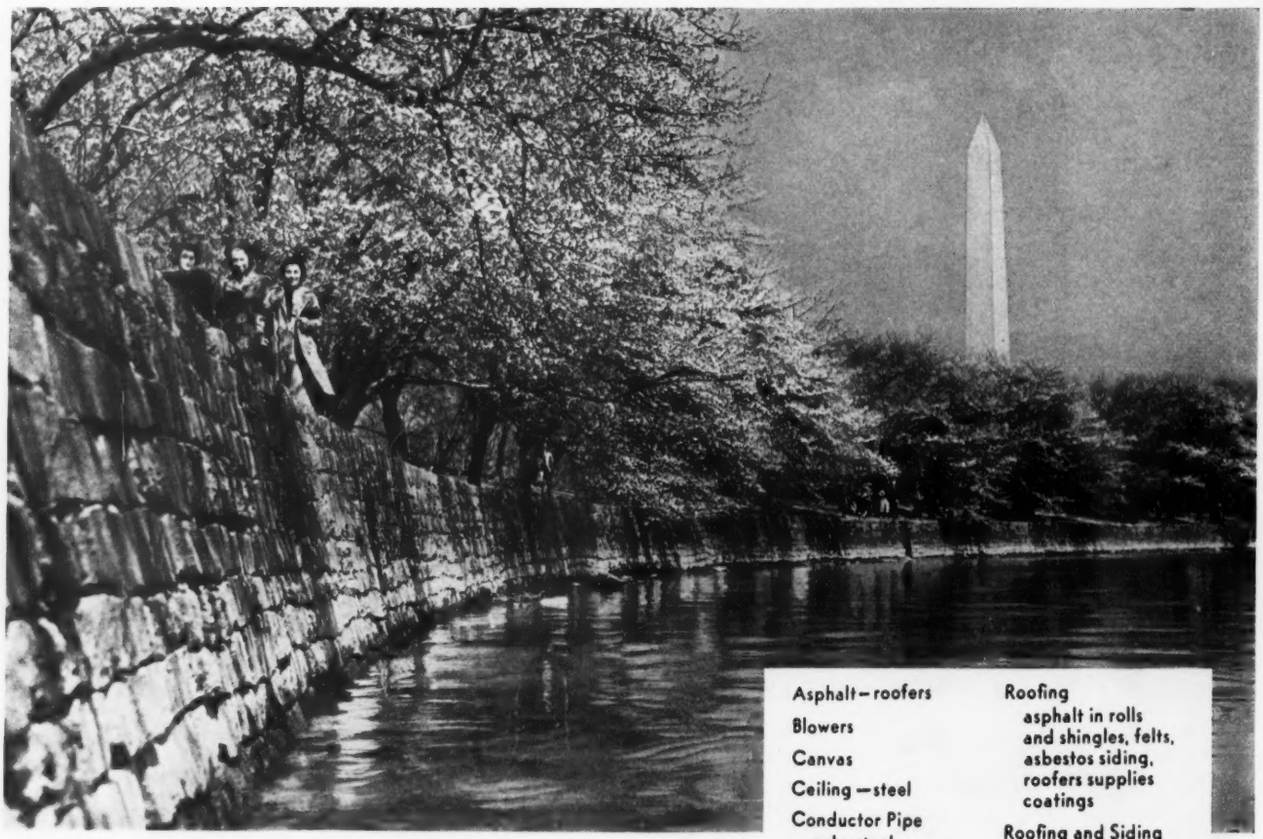


THE MAGIC HAND

MAKES IT EASY TO PULL PROFITS OUT OF THE HAT

The dealers who have been handling Conco Stokers for one or more seasons, continue to handle the line and sing the praises of this stoker. That is because FIRST, the Conco is not only an attractive, but an efficiently operating machine. This means very few service calls, leaving more time for profitable selling. SECOND, Conco dealers are given friendly, helpful factory help—not only in selling, but in those few service problems that do arise. THIRD, the price is right. When you handle the Conco, you can be sure (for an equal quality of machine) that your price is low. FOURTH, Conco dealers are given a lot of sales helps—literature, mailings, sales manuals, newspaper advertising, sales contests, demonstrators, window display material, show room displays, etc. An advertising allowance with every stoker sold. FIFTH, a liberal floor finance plan and an equally liberal retail finance plan. SIXTH, in dealing with Conco-Sampsel Stoker Corporation, you are dealing with an experienced engineering organization of sound financial background. Reasons enough, don't you think, to make it urgent for you to write us now concerning the Conco Dealer Franchise in your city?

CONCO-SAMPSEL STOKER CORP. BOX 111A MENDOTA, ILL.



Cherry Blossom Time in Washington

LET'S COPY NATURE

The drab landscapes of late winter have given way to budding trees, gayly colored blossoms and the fresh green look of the countryside. Yes, Spring is here and Nature is busy on every side repairing the ravages of snow, ice and storm.

Let's copy Nature and get busy replacing the winter worn trough and conductor, roofing shingles and siding, defective heating system parts and burned-out furnaces. A little aggressive selling will start it and soon, with a new home building program getting under way, there will be more than enough work.

This year, as usual, OSBORN is ready to do its part. Complete stocks, prompt deliveries and a new 5% no down payment credit plan will help you get new customers. Satisfaction with your work and our materials will enable you to keep them. For prompt action on any of the materials you need to get the ball rolling, just order them from your OSBORN Stock List.

THE J. M. & L. A.
OSBORN Co
Manufacturers—Distributors
BUFFALO · CLEVELAND · DETROIT

Asphalt—roofers
Blowers
Canvas
Ceiling—steel
Conductor Pipe
galv. steel, Armco iron, copper, 40 lb. terne
Controls
automatic heating
Eaves Trough
see conductor pipe
Fans
furnace, exhaust, propeller
Furnace Pipe and Fittings
Furnaces
Grilles
Gutter, O. G.
see conductor pipe
Hangers
eaves trough and gutter
Hooks
conductor pipe and flashing
Humidifiers
Machinery
hand, foot and power
Nails
Paints
tinner's red and house paints
Paper
asbestos, red rosin, building, asbestos mill board
Registers—warm air
Ridge Roll
Roofing
asphalt in rolls and shingles, felts, asbestos siding, roofers supplies coatings
Roofing and Siding
galv. steel, Armco iron, copper, ternes
Roofing Ternes
40 lb. and 25 lb. in IX and IC
15 lb. and 8 lb. IC
roll tin IX and IC
Screws—sheet metal
Sheets
aluminum, steel, iron, copper, zinc, stainless, long terne, enameling
Sheets (Corrugated)
Sheets (Perforated)
Sheets (Plated)
chrome and nickel plated zinc, copper, tin and steel
Siding
galv. and painted
Solder and Fluxes
Tin Plate
charcoal, cokes, imported dairy, roofing ternes
Tools
every kind used in sheet metal
Ventilators
roof and fan
Welding
equipment and supplies; both arc and gas

A DEPENDABLE SOURCE OF SUPPLY FOR 79 YEARS

HITCH YOUR Profit-Wagon to this new STAR SELLER

Pacific

MODEL A-69 BLOWER FURNACE





Blower and heating units are contained in separate cases for easy handling and installation in basements.

Check These SALES-INCREASING FEATURES

- Blower and heating units contained in separate cases to facilitate handling, transportation, and installation in basements without expense and loss of time in knocking down and re-assembling.
- Cases easily and securely joined together, giving appearance of modern, streamlined one-piece casing.
- Sturdy built-in blower for supplying constant, uniform flow of air for heating and air-conditioning.
- Dry-type filters mounted in blower casing; provides easy accessibility for cleaning and replacement.
- Combination fan and limit control starts fan *after* furnace is heated—avoids delivery of cold air and automatically prevents overheating.



- Adjustable air delivery ratio provides greater air flow for summer ventilation.
- Summer cooling equipment can be easily added if desired.
- Equipped with proper Pacific Multi-Tubular Burner designed for the kind of gas used in your territory.
- Round, all-welded steel heating element. Rust-resisting, leakproof.
- Pacific automatic safety pilot shuts off gas to main burner if pilot flame is extinguished for any reason.
- Made in wide range of sizes and capacities. Meets all heating and ventilating demands for small or large residences, churches, offices or commercial buildings.

WHAT THE PACIFIC MULTI-TUBULAR BURNER MEANS TO DEALERS

The Pacific Multi-Tubular Burner consists of several small individual blue flame bunsen burners—each having its own independent air and gas supply mixed in exactly the right proportion for maximum flame temperature and greatest fuel economy. The air-gas mixer in each burner tube is accurately and scientifically proportioned at the factory—no further air adjustments required. Pacific Multi-Tubular Burners are tamper-proof—cleaning or meddling by inexperienced persons cannot change the adjustment. Pacific dealers know that this feature alone is a profit booster because it cuts down on service calls and insures continuous, satisfactory, economical performance.

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AMERICAN ARTISAN

Volume 107 Number 4

Association Progress

ALMOST without exception attendance at state association meetings this year has far exceeded attendance of previous years. This increased attendance has been due, in part, to greater effort on the part of organization officers, wider publicity, better programs of more practical value, but also due, we believe, to the growing feeling in the industry that only through organized effort can the problems confronting contractors be satisfactorily solved.

Take, for instance, the problem of jack leg contractors, sometimes called mechanic contractors. In some communities this problem has become so acute that city officials are appealing to the industry to help themselves and the city officials. A building inspector, speaking to contractors at a state meeting this spring, declared that in his city so many automobile body sheet metal mechanics were doing heating, roofing and sheet metal work on the side or on Sundays or at night that fire hazards had assumed alarming proportions and home owners were being shamefully mistreated.

Or, for example, the matter of licensing contractors and modernizing building codes to control design and installation of heating systems. No matter how much any one or any dozen contractors may wish to raise standards, it is impossible to get the necessary legislation without organization.

In circularizing associations for news of activities we have been impressed, this year, by the serious programs under way. In Philadelphia, as an example, a class in heating has been making progress for several months. In addition, the assistance offered contractors with their bookkeeping and cost accounting problems is entering its twentieth year. In Cleveland the organizations have set up a voluntary code of ethics and a plan service to raise standards and eliminate unsatisfactory installations. In Buffalo, N. Y., two associations are working to raise standards and eliminate unfair competition. In Toledo, Ohio, the association has placed a code governing gravity heating in effect and is about ready to include mechanical warm air heating. In Chicago, four associations are working on cost accounting, sales management, trade ethics, design standards and on control of conditions in the area.

These programs are under way all over the country. It seems to us that the present tendency to organize locally first, then on a state wide basis, leaving national organizing to come later is a much sounder program than working from the top down as the industry did in years gone by.

"I Agree to Heat—"

AN interesting situation has developed in several communities—wherein heating contractors have been called back on house installations on the complaint that the house was not satisfactorily heated and have found that everything checked exactly with the heat loss and data sheet.

It may be of interest to the industry to know that after considerable investigation the trouble was found to be that instead of 4 inches of insulation in side walls and attic floor there was only 2 inches of insulation in the side walls and under 3 inches in the floor.

Further investigation disclosed that the building contractor purchased insulation 4 inches thick, but split the bats to get twice the area only half as thick. The difference in the heat loss made some exposed rooms cold, although register temperature and register cfm were fully up to calculations.

In another case brought to our attention, the owner purchased his house (inside unfinished) from a builder who had several houses going up in the neighborhood and in the sample house showed walls insulated with 4 inches of fill and 4 inches in the attic floor. Outside the house bought, insulation was stacked under cover so the owner assumed that the pile of insulation was for his house.

It turned out that after the contract was signed most of the pile of insulation was moved off the lot to another house ready to be exhibited.

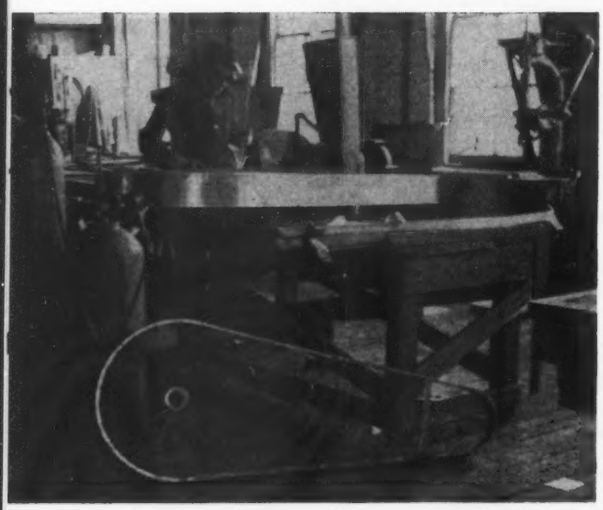
The owner got no insulation in his walls, but did get insulation in the attic floor where it could be inspected.

In two localities these two practices became so widespread last winter that heating men joined together and included inspection of the insulation in the furnace inspector's duties.

That skimping of insulation may account for a good many difficulties is not beyond reason. Whether skimped deliberately or through carelessness, the result is the same trouble so far as the heating man is concerned.

We suggest, therefore, that if these practices are occurring in any community all heating men ought to add a section to their specifications and guarantees to the effect—"If the heating plant proves of the size required; the air delivery is according to calculated needs; the register air temperature meets specifications—at the calculated heat loss—burden of proof that the walls and ceiling are insulated as specified shall rest with the insulating contractor."









Herrmann and Grace Co.

1886-1938

FROM tin ware to air conditioning.

Old timers in the industry well know how many years are encompassed within this period of sheet metal activity, but for those whose recollection fails to carry back it is 1886 to 1938. There are, probably, many sheet metal firms whose business life extends back fifty years, or more, but few, likely, more truly reflect the changes in activity typical of a sheet metal contracting firm than the experiences of Herrmann and Grace Company of Brooklyn, N. Y.

When Herrmann and Grace was founded in 1886, the firm occupied a basement store and carried a full line of hardware and tin ware (much of its own making); and maintained a sheet metal shop making cornices, skylights, leaders, gutters, metal roofing. Also the firm specialized in cleaning furnaces and ranges.

During the busy season 20 to 25 mechanics were employed and since the firm was located in a fine residential section, the company prospered. Very few hardware stores of that time and that area carried a full line of merchandise or were prepared to handle so many different kinds of sheet metal work. Also, the store was only one block from the Long Island Railroad station and so drew a considerable volume of business from farmers who lived in small towns along the railroad.

By 1898, department stores had begun to carry full lines of hardware and utensils resulting in a gradual falling off in this trade so the firm decided to branch out farther into sheet metal contracting and discontinue hardware. About 1898 there began a period of great activity in residential building and, since the firm was well acquainted with most

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From top to bottom—One of several large power presses set up to form parts of standard H & G window frames. All types of welding are employed; this mechanic is gas welding expanded metal to a black iron frame for a belt guard. A small power squaring shear used mostly in ventilation work. A large volume of work is done in bright metals; very frequently final finishes are handled in the shop. The mechanic is polishing a stainless steel back plate of a vendor.

of the building contractors, the sheet metal work assumed large proportions.

School Ventilation

Also about this time the city of New York began an extensive school building program and as a part of the program began to pay more and more attention to the matter of proper ventilation in schools. Not many firms of that period knew much about ventilation, nor had the equipment to handle large sized ventilation contracts at economical costs. So Herrmann and Grace began to specialize in ventilation.

This class of work required large floor space, new power machinery, skilled mechanics for fabrication and erection and special technique in handling contracts. So three floors with an elevator were rented above the old store and suitable equipment was bought to handle ventilation contracts on a large scale. Year in and year out for several years, 75 men or more were steadily employed—mostly in ventilation work.

Fire Doors and Windows

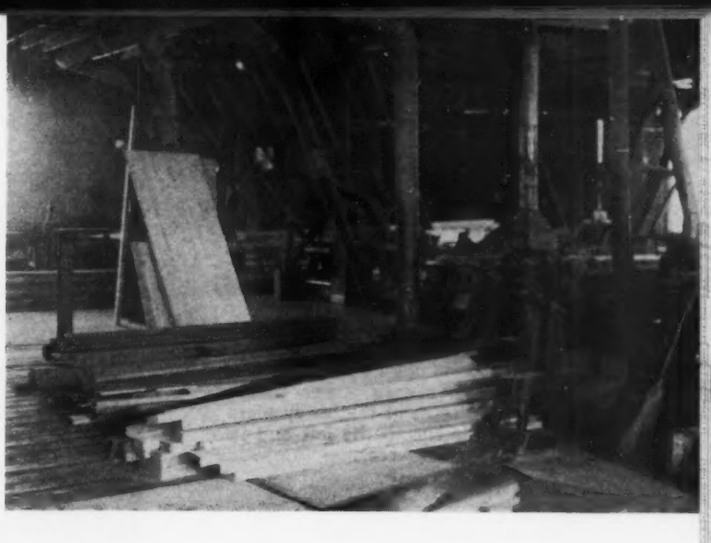
Meanwhile, between 1900 and 1906, fire-proof construction really got started in New York and with this type of construction came a growing demand for fireproof doors and windows. This opened up a new field—one well suited to the firm's large space, power equipment, skilled mechanics and intimate knowledge of construction and constructors. Further, there were not many firms able to manufacture fire proof doors and windows, so Herrmann and Grace began developing and manufacturing these items.

The New Home

More floor space was required; also new machinery, so the firm built its own building planned for manufacture of ducts, skylights, cornices and general sheet metal work on the first floor and with complete metal and wood working equipment for metal fire doors and windows on the second floor.

So equipped and organized for large scale production, the contract for the slate and copper roof, all sheet metal work in the tower and the copper covered windows of the Singer Building was secured in 1907. Then came the Woolworth Building and many more of the growing number of "skyscrapers" of the early twentieth century.

About this same time a tremendous activity de-







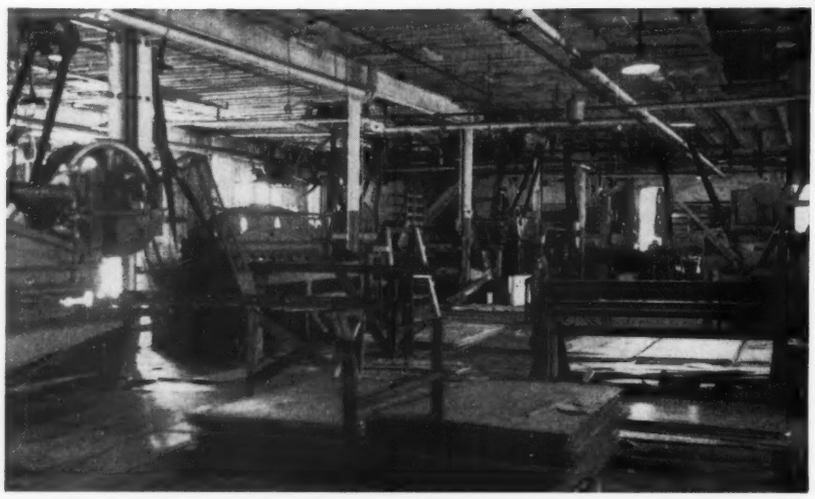


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From top to bottom—The battery of saws, planers, jointers of the wood working department. Sheet metal machines of the wood working department where metal is cut for covering doors. Special bronze and brass sheet department where wood doors are covered to order. Mechanics are working on a large order (complete skyscraper) of interior doors to be covered with brass.



At right—Part of an order for galvanized iron window frames fabricated and soldered, but waiting to be smoothed down and finished. Below—Looking across the first floor with power shears and presses of the heavy plate department to the left and in rear.



veloped in pier construction and piers in New York City, the Delaware and Lackawanna pier, and piers in Hoboken were added to the growing list of impressive construction awarded to Herrmann and Grace. During the World War building construction fell off, but was replaced by government work, the largest being all sheet metal work in Camp Stewart and Newport News with smaller contracts in camps in New York State.

The building boom following the war found the firm well equipped to handle contracts of most types and all sizes and metal and slate roofs, fire doors and windows, ornamental and outside metal work, marquise, ventilation and the first air conditioning installations passed through the shop in ever increasing volume.

Work in White Metals

With the reduction in building construction beginning about 1930, Herrmann and Grace turned shop facilities into new lines of activity. The hollow metal doors and windows of the post war period were replaced by newer types of windows of new materials. Aluminum, extruded and shop formed; stainless steel and other white metals were adopted to new designs of doors and windows; inside equipment for restaurants and hotels; outside metal adornment popular then and now.

But like many other large sheet metal firms, this type of work could not keep the large shop busy and with the tremendous increase in air conditioning Herrmann and Grace has found that since 1930 more and more of the shop facilities have been turned over to the fabrication and installation of sheet metal duct work for air conditioning. Large jobs and small jobs; a few pounds to many tons of sheets; simple duct systems to the most intricate of installations have crossed the estimating boards and added their bit to the persistent drive to make people comfortable.

Many of the mechanics in Herrmann and Grace employ have been with the firm 15, 20, 25 years or more.

And, while the work here mentioned has constituted the backlogs which kept the shop busy, many other kinds of work have been developed. Machine and belt drive guards of black iron and expanded metal have been steadily produced. Galvanized iron door and window frames have been a steady production item. Stainless steel door and window and store fronts for the far flung Woolworth chain have been fabricated and shipped all over the world. Tin clad fire doors for the thousands of loft and industrial buildings of the New York area have been in steady production since the beginning of the century.

As experimental work, aluminum sections for patented pre-fabricated metal houses have been developed and produced. Ornamentation of interior trim such as bronze covering for doors have brought in several very large contracts. And lately an entirely new extruded aluminum window is reaching production stages.

Thus Herrmann and Grace—first tin ware and hardware and sheet metal for houses—has followed the changes in sheet metal practice since 1886. Today, the sons of the founders carry on the business which began so modestly more than fifty years ago.

New York State Ass'n Discusses Legislation, Business and Technology

NEW YORK State contractors, meeting in Buffalo, March 7, 8 and 9 for the fifteenth annual convention of the New York State Sheet Metal, Roofing and Air Conditioning Contractors Association, Inc., discussed matters of legislation, business operation under 1938 conditions, prospects for future business, in addition to an elaborate program of technical and business subjects.

President Otten, welcoming delegates and members of the association to the convention, declared that 1937 in the majority of cases had showed a final result somewhat above 1936 in dollar volume, although perhaps not very much of any increase in unit volume.

Directional Flow Registers

S. Konzo of the University of Illinois, stated that he believed one problem which has become acute is the growing tendency of contractors to use the cheapest type of register faces. Mr. Konzo declared that he had no objection to such registers from a price basis, but he did believe that the contractors were overlooking the advantages of the costlier but more effective types of register faces. To illustrate, Mr. Konzo said that ordinarily low priced registers are not offered in deflecting types and that proper use of deflecting registers will solve some of the bothersome problems of air distribution within rooms. He showed a slide from a U. of I. bulletin showing that with proper deflection a floor temperature only three degrees below the temperature at the breathing line is possible, whereas under intermittent operation with plain open registers, six degrees temperature differential is not uncommon. Also the temperature difference between the breathing level and ceiling can be reduced to 1 to 1½ degrees temperature differential with proper deflection. Mr. Konzo illustrated how with adjustable deflection the air stream may be directed toward the floor fan-wise or held within a narrow spread where projection to facing walls is desirable.

The Exposed Room

As a second problem, Mr. Konzo pointed out that the isolated room (as for example, the sun room in the Research Residence) has always been a difficult heating problem since most of these isolated rooms have three exposed walls and a high area of glass surface which means a high radiant heat loss from the body and increased infiltration. Mr. Konzo declared that the ASH&VE recommends raising such room temperatures at least five degrees and in the Research Residence it was necessary to raise the sun room temperature 2½ deg. to bring comfort conditions to a comparable level with other rooms in the structure. One of the important problems is the matter of rapid heat loss in such rooms and thermostats in adjoining rooms are not capable of maintaining a satisfactory temperature in these exposed spaces. In the Research Residence sun room, the temperature drop was 2½ times faster than the temperature drop in other rooms of the house.

The suggested remedies are the use of tight storm sash on windows or doors; weatherstrip on all of the windows to reduce infiltration, increased cfm to raise room temperature to 75 or even 80 deg. under normal fan operation, and, where possible, either zone control or two-speed fan operation.

Pressure Losses in Fittings

Prof. Konzo suggested as a last problem that contractors pay more attention to pressure losses in fittings, and showed a number of slides of his tables of fitting pressure losses published in the January issuse of AMERICAN ARTISAN. Mr. Konzo suggested that where there are numerous fittings in any one trunk line system, the contractor add up his fitting pressure losses from these tables and thus arrive at a closer estimate of the actual pressure losses within the system.

For the benefit of readers who did not study the Konzo pressure loss tables in the January issue, it might be pointed out that these tables are based upon the pressure loss of the fitting in terms of equivalent length of straight pipe as well as in terms of actual pressure loss in inches of water gauge and the tables are so complete that practically any type of fitting can be calculated from the tables. So far as possible, in view of the limited supply of tear sheets, the editors will be glad to furnish a set of these tables to interested readers.

Air Distribution

R. L. Leigh of the Hart & Cooley Mfg. Co., discussing proper air distribution, declared that an air conditioning system is good or bad as it does or does not provide proper comfort. Proper comfort, in turn, depends upon proper air distribution. If ceilings are hot and floors are cold, room comfort conditions are usually bad, whereas if the temperature difference between floor and ceiling or floor and breathing level is at a minimum, comfort conditions are usually obtained. Mr. Leigh suggested that to determine the proper air distribution, we should (1) calculate the heat loss or cooling load; (2) determine the actual register temperature which we will have and compensate for temperature drop;

(3) calculate the proper comfort cfm at the actual register air temperature; (4) select the best register location possible; (5) determine the proper air velocity at the register face; (6) determine the proper air velocity for cooling which may be different than for heating.

Mr. Leigh pointed out that with the present available types of registers and the present information on air distribution, it is now possible to place the register near the ceiling, at the base board or just above. The baseboard location is probably lowest in cost and as the warm air enters near the floor, there probably is less temperature drop from the bonnet to the register. With deflecting registers of the proper type the air can be held in a fan spread stream close to the floor and made to carry to the opposite wall. The disadvantage of the baseboard location is that furniture is often placed in front of the registers. Further disadvantages, cited by Mr. Leigh, are drafty conditions if the velocity is over 300 ft. per minute and a feeling of cold draft if the register air temperature drops below approximately 100 to 125 deg.; also that baseboard location is not quite so advantageous as high sidewall in exceptionally large rooms. Mr. Leigh declared that baseboard location is not desirable for cooling.

The high sidewall register is advantageous because the contractor can use a higher velocity and thus be sure that air carries to opposite walls or to cold surfaces, smaller grilles can be used, there is not so much likelihood of drafts and the high sidewall location can be used for both heating or cooling. Early disadvantages of high sidewall location were stratification of air within the room under intermittent fan operation and discoloration of the ceiling. These disadvantages can be overcome by more continuous operation of the fan and proper deflection to throw the air downward from the ceiling.

Mr. Leigh pointed out some things not commonly taken into consideration as, for example, in cooling the air must be prevented from striking forcibly against any object such as columns, furniture or walls as cold air striking such objects falls vertically downward and creates a draft; air velocity must be considered in relation to the quantity of air issuing from the register, as a large mass of air has a greater carrying ability than small volumes of air.

In Mr. Leigh's opinion, the location and velocity of return air faces are not particularly critical, as return faces tend to pull from restricted areas and there is very seldom any feeling of high air velocities near return air grilles. The location of returns is important, however, in relationship to the amount of air exhausted since air leaving rooms which are not ventilated, finds exit through returns in distant rooms, thus setting up a draft condition.

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Codes and Licensing

J. D. Wilder, editor of AMERICAN ARTISAN, speaking on Licensing Ordinances and Heating Codes, declared that interest in codes and licensing has increased tremendously in the past two years, whereas four or five years ago very little interest was shown. The speaker pointed out that a great many attempts have been made to control situations where price is too low or installations are poor, and up to date no better method for handling this problem has been devised than the incorporation of proper mechanical heating codes in the building ordinance.

On the need for securing proper incorporation of codes in building ordinances, the speaker declared that a review of present building codes discloses the fact that very few codes have adequate gravity warm air heating sections and that, generally speaking, mechanical warm air heating might not exist so far as the usual building code is concerned. Using as examples several cities which have adopted codes, the speaker pointed out that there are at hand a number of factors which can be helpful, such as the fire marshall who is always interested in fire hazards; the building inspector who is anxious to have better general types of construction; consulting engineers and architects who want to see the general level of construction, particularly heating plants, raised in most communities; and, most important of all, the heating contractor who finds himself unable to cope with low prices and skimped jobs unless there be one general basis for all design.

Opening the proposition of codes and licensing to general discussion from the floor, a number of contractors cited problems encountered in attempting to incorporate heating ordinances. One such problem is the complaint of a minority that a licensing agreement tends to put some individuals out of business. The practical solution is to permit everyone engaged in business to operate under the original licensing agreement, and depend upon adequate inspection to eventually eliminate the contractors who will not live up to the provisions of the ordinance.

In answer to the question of how a code can be started on its way, the speaker pointed out that in most communities it is necessary to gather together

a small group of individuals who are anxious to see a code and a licensing ordinance incorporated. This group must try to enlist the assistance of the fire marshall; aldermen or civic employees interested in better construction; architects and builders or consulting heating engineers, and then to select one or two councilmen who are most interested in the proposition. From this point on every effort must be made to widen the circle of active boosters eventually reaching a place where the ordinance is actually drafted and presented to the council for approval.

The speaker also pointed out that no ordinance or licensing agreement is worth the paper it is written on unless proper provision is made for adequate and honest inspection, for upon this inspection depends the success of the ordinance and the general bettering of local conditions.

C. A. Olson, speaking for H. T. Richardson, who was absent, declared that the National Warm Air Heating and Air Conditioning Association is trying to assist in every possible way to advance the standing of warm air heating. Mr. Olson cited the research program as an outstanding contribution to better heating and pointed out that this program of research has been going on for twenty years and that there still remain many problems which must be investigated. Mr. Olson declared that home owners and architects generally accept the Research Residence recommendations for proper heating and with proper publicity and continued research the entire level of warm air heating will undoubtedly be raised in the next few years,

Shop Cost Records

Fred U. Ritter, Secretary of the Roofing, Metal and Heating Engineers Association of Philadelphia, speaking on bookkeeping and cost accounting, projected upon the screen a number of cost records of shops in the Philadelphia area ranging in total annual volume from just over $7,000 to more than $100,000 per year. Mr. Ritter pointed out that the Philadelphia association has been keeping and watching cost records of more than 100 shops for over fourteen years and that as a result of this long period of operation, the association believes that proper attention paid to cost records can make a shop successful and profitable or throw the owner out of business.

Mr. Ritter expressed the opinion that too many contractors work long and hard to perfect their mechanical skill and knowledge, but are not inclined to pay very much attention to business management or cost accounting. He declared that bookkeeping must be learned and applied if a man is to stay in business.

In the Philadelphia area, according to Mr. Ritter, all of the shops using satisfactory bookkeeping system have found a minimum price below which they can not go and still make money and continue in business. If a shop disregards overhead, eventually that shop goes out of business due to a failure to make money, whereas if the shop watches overhead, takes fewer jobs, but insists on making a profit on each job, the shop can stay in business and make money. An interesting side light disclosed by the Philadelphia records is that very few shops operate to capacity, and that, generally speaking, increased volume at the same basic overhead rate means increased profit.

Discussing the various slides which were thrown upon the screen, Mr. Ritter declared that too many shop owners do not realize the size or seriousness of the item of non-productive labor. Taking a general run of small sized shops ranging in annual total volume from $7,000 to $25,000, Mr. Ritter showed that in most such shops non-productive labor approximates 57 per cent of the total volume of overhead and that approximately 33 per cent of the 57 per cent is chargeable to the owner's non-productive hours of labor. The next highest cost was automobile and truck operation accounting for 13 per cent; rent 8 per cent, sales adjustments, bad debts and comebacks approximately 8 per cent, etc.

Taking all of the shop records thrown upon the screen, it was disclosed that the average overhead of these shops was at least 100 per cent of productive labor and very frequently ran considerably over 100 per cent. The net profit shown ranged from five per cent to approximately 25 per cent, and the total annual gross volume of business had very little to do with the actual net profit. Some small shops showed an actual dollar profit larger than shops enjoying a total annual volume three or four times as large. Readers can find in the January, 1938, issue of AMERICAN ARTISAN some of these typical Philadelphia shop records.

1938 Building Prospects

At the joint meeting of the contractors with Buffalo architects and builders, Thomas F. Holden, president of the F. W. Dodge Corporation of New York City discussing prospective building conditions for 1938, declared that 1937 volume was under that of 1936. Also, that some of the uncertainty of the 1937 figures can be traced to the fact that estimates for 1937 were based upon supposed need, whereas the actual shortage in houses has since been found to be in the families where a $3,500 total cost must be the maximum. Mr. Holden declared that he does not anticipate any building boom such as we have seen in years gone by but that there will be some volume of construction because people will still build new houses and pass on the old houses to families incapable of building new homes of equivalent price value.

In Mr. Holden's opinion, most successful business enterprises have been based upon the general principles of larger production, better distribution, better products, at a lower cost, and the building industry must comply with these general provisions if it is to enjoy equal prosperity.

Compensation Insurance

Thomas G. Gorman of the New York State Insurance Fund, speaking on the subject of group in-

(*Continued on page* 38)



Right: A slab leaving one of the three h mill roughing stands at Republic's ne 98-in. continuous strip mill. The roughi stands, where the most drastic reducti in the thickness of the steel is made, a driven by 3000 H. P. motors.

The 98-in. skin-pass mill.

Republic's New

Continuous Strip Mill

Republic Steel Corporation formally opened its new 98-inch hot and cold strip mills in the Cuyahoga Valley at Cleveland on Tuesday, March 15. The mill is the largest, fastest and most modern continuous strip mill in the world.

The mills roll strip steel 94 inches wide from slabs which speed through a series of electrically controlled roughing and finishing mills to the coiler almost a quarter of a mile away in as little as 240 seconds. Steel moves through this mill at speeds up to 2,121 feet per minute and is wound into coils weighing as much as 12,500 pounds apiece. The plant has a capacity for production of a million tons of hot and cold rolled sheet and strip per year.

The mill buildings cover 21 acres and stand on a 182-acre site, part of which is land which was made by changing the Cuyahoga River Channel. The most modern types of handling equipment; electrical devices which give absolute control of working temperatures and speeds throughout the hot rolling, pickling, annealing and cold rolling departments; and scientific lighting provide efficiency and ideal working conditions throughout the plant, which has a potential employment capacity of over 2,000 men. A large welfare building and an office building complete the group.

The new mill embodies in its design every technological improvement that the country's best mechanical, electrical and metallurgical engineers have thus far developed in the art of processing steel. Recent improvements and developments in lubrication, hydraulics, welding, design of bearings and electrical control, which make possible the production of extra wide sheet steel at the speeds employed in Republic's new mill, are featured throughout the plant. So, too, are latest advanced factory management practices and technique in the efficient handling of materials, in the metallurgical control of products being processed, in the coordinating of all mill operations, and in the establishment of safe, healthful working conditions for humans in the plant.

The hot mill can roll all finished widths from 30 to 94 inches and all finished thicknesses from 18 gauge strip to half inch plate. The plant has a nominal rated capacity of 70,000 gross tons per month.

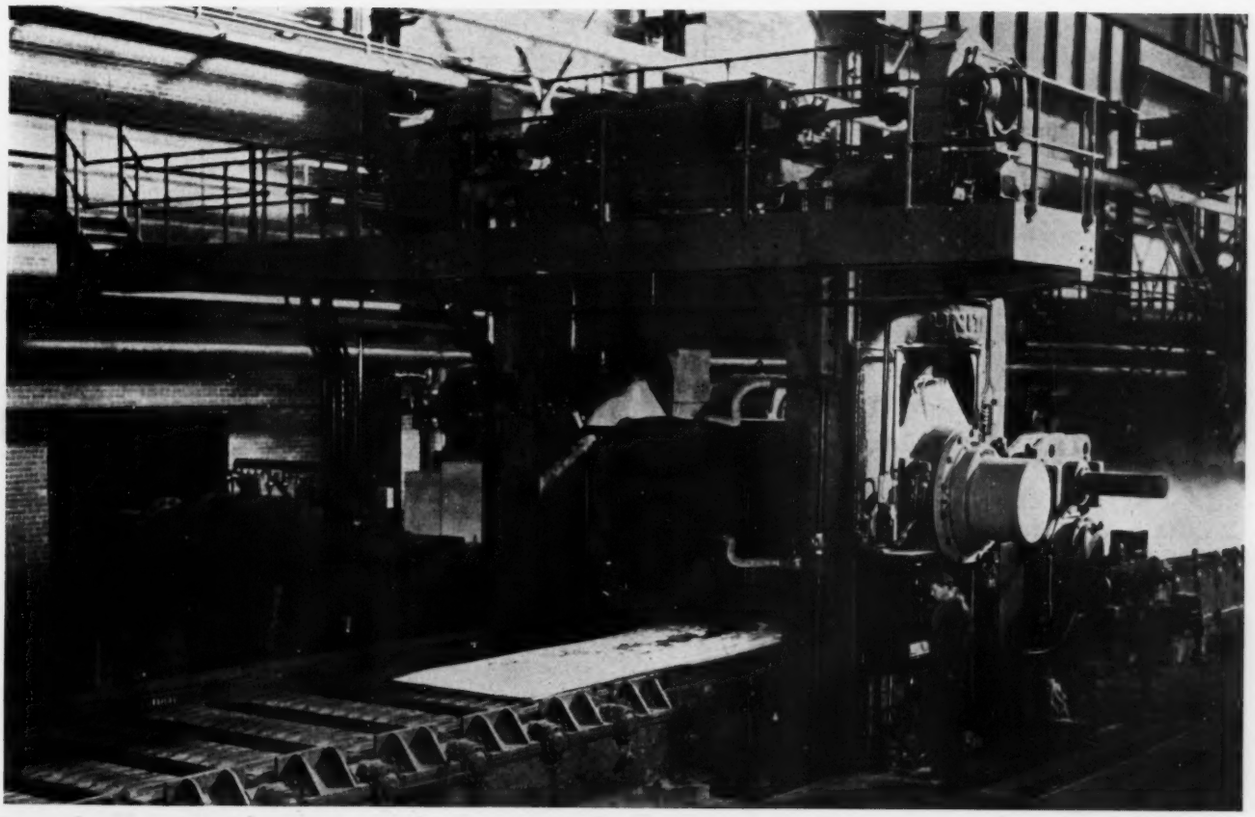
The appearance of the mills is that of two enormous industrial plants. Actually, however, these two structures consist of a total of nine large buildings. In addition, there is an office building with completely equipped testing and metallurgical laboratories in the basement, a welfare building with shower and dressing room accommodations, and a machine shop, a carpenter shop and a large pump house on the river bank.

The architect for this construction was Albert Kahn, Inc. of Detroit.

The location of every machine and of every item of equipment in the plant was scientifically worked out after months of intensive study.

Slabs for the new strip mill come from Republic's nearby Corrigan, McKinney plant which has been enlarged and improved.

Following inspection of the mills, the guests were entertained at luncheon and welcomed by R. J. Wysor, president of the corporation. A dinner concluded the day's celebration. T. M. Girdler, Republic Chairman, and C. M. White, vice president in charge of operations spoke.





Geoffrey Landesman Photo

A slab just discharged from one of the slab heating furnaces at Republic's new 98-in. continuous strip mill enters the roughing scalebreaker. Here the scale is removed by a spray of water under pressure. This stand is a 2-high mill.

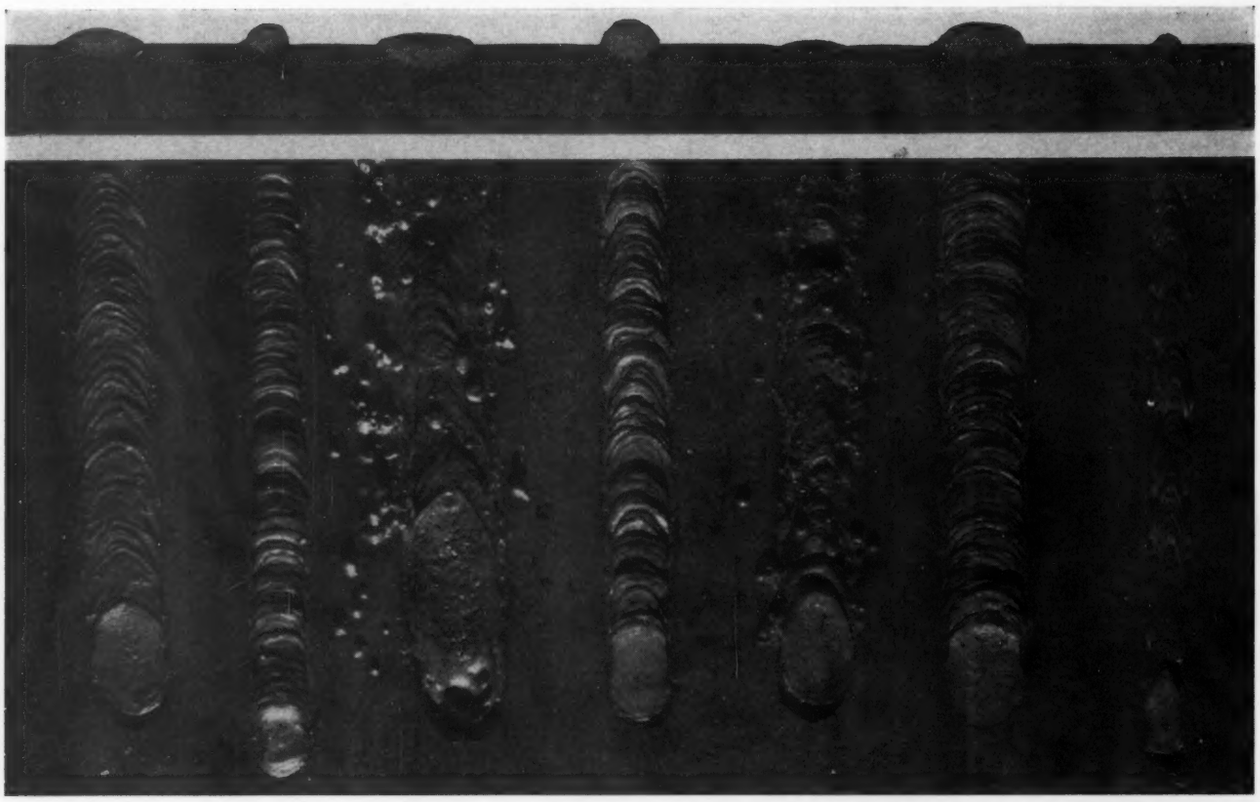


Fig. 1 Fig. 2 Fig. 3 Fig. 4 Fig. 5 Fig. 6 Fig. 7

How To Tell a Good Weld

By A. F. Davis
Secretary, The James F. Lincoln
Arc Welding Foundation

IN the previous article (January, 1938) consideration was given to *selecting* and *placing* welds as an important factor in obtaining desired results at lowest cost. The present article will discuss the simplest method of *telling* a good weld. This method utilizes data which can readily be observed and will, if sensibly applied, assure production of sound welds.

With the establishment of schools designed to train men in the art of arc welding, the supply of excellent operators has been greatly increased. There is no necessity for being skeptical as to the quality of work done by these trained operators. Men who have had experience know without testing whether a weld is good or bad, and the beginner can quickly learn to judge the quality of his welds. Long before he has become skillful enough to lay a good bead, he can learn to know the difference in appearance between a strong weld and a weak one while the bead is being made.

In order to produce a good weld, and by that is meant a strong weld, the operator must use correct polarity, the right amount of current, proper arc length and proper speed of travel. It is assumed, of course, that the operator is using a good machine and good electrodes of the size necessary. The problem under discussion concerns only the variables over which the operator has control—the so-called "human element."

How then can one tell which of these variables is being handled incorrectly?

A series of simple tests show clearly how each of the variable conditions affects the resulting weld. These apply to the welding of mild steel using a bare or washed electrode.

First, there are four things to watch. These are:

1. The burn-off of the electrode.
2. The fusion and penetration (indicated by the crater).
3. The piling up or forming of the bead on the work.
4. The sound of the arc.

These four tell-tale signs indicate to the operator just what the trouble is or, if they are as they should be, that the weld is sound. In regard to the terms "penetration" and "fusion," a word of

The photograph on the facing page shows from left to right—Fig. 1, a weld produced with normal current; Fig. 2, a weld produced with too low a current; Fig. 3, a weld produced with too high a current; Fig. 4, a weld made with too low a voltage; Fig. 5, a weld made with voltage too high; Fig. 6, a weld made with a speed too low; Fig. 7, a weld made with too high a speed.

TABLE 1

Operating Variables	Resulting Weld Characteristics				
	Arc Sound	Penetration Fusion	Burn-off of Electrode	Appearance of Bead	Comments
Normal polarity, correct current, voltage and speed of travel	Steady, sharp crackling sound	Good crater averages 1/16" deep for 1/8" rod	Stable	Smooth, no overlap	
All variables normal except that indicated — Low current	Pulsating "low energy"	Poor—very shallow crater		Bead piles up—overlap	
All variables normal except that indicated — High current	Explosions, crackling	Poor weld characteristics—porosity		Flat	Electrode becomes red hot, splatter weld porous
All variables normal except that indicated — Low voltage (across arc)	Steady sputter	Poor crater shallow	Rod apt to freeze to work	High	
All variables normal except that indicated — High voltage (across arc)	Whistling or hissing and crackling	A very little fusion, shallow crater	Bubble on end of rod arc wanders	Flat	Splatter pockets in weld, weld oxidizes
All variables normal except that indicated — Low speed of travel		Crater excessively deep		Piles up and rolls, over bluish color	Electrode becomes red at tip, splatter
All variables normal except that indicated — High speed of travel		Almost no crater—no fusion		Irregular in width, flat	
All variables normal except that indicated — Wrong polarity	Sputter	No crater, porosity		Irregular	Spatter

explanation is necessary. Frequently they are used synonymously, but actually they are not the same. Proper penetration means that the parent metal is melted and in condition to receive all of the weld metal deposited and not permit it to overlap on the parent metal. Penetration greater than is necessary to secure fusion is not to be desired. Ordinarily, with proper penetration you get good fusion.

Now for the tests, and it is suggested that interested readers make these tests in their own shops. For quick reference a table of weld characteristics is given as follows:

How to Judge Welds

The following chart Table 1 applies to the welding of mild rolled steel with bare or washed electrodes in flat position. The resulting weld characteristics are those obtained when all variables are normal except that indicated at the left.

Current Variations

With a normal current (See Fig. 1), the arc sound has a sputtering hiss with somewhat irregular cracking. The fusion is well defined and deep, the coating burns deeply and there is no overlap. Now if the current is reduced too low (See Fig. 2), the arc sound has a very irregular sputtering and slight cracking. The fusion is shallow and the bead is on top of the plate. An increase of current to a value which is too high (See Fig. 3), results in irregular explosive sounds and the fusion is deep and long, the coating is consumed irregularly and a broad, thin bead with good fusion is obtained.

Arc Voltage Variation

Supposing now that we reduce the voltage to too low a value (See Fig. 4). We will get a hiss or steady sputter. The fusion is fair, the coating touches the molten metal, does not have an opportunity to be transformed into gas and therefore, porous beads result. The bead is on the plate and rather broad. On the other hand, if we increase the voltage to too high a value (See Fig. 5), we will get a soft hiss with few crackles. The fusion is wide and deep, the electrode has drops on the end, which splutter about and finally drop into the crater. The bead is wide and there is considerable splatter.

Speed Variations

The sound of course, is normal, but with the speed low (See Fig. 6), there is a fair crater, the electrode performance is normal but the bead is

TABLE 2

Operating Variables	Resulting Weld Characteristics			
	Arc Sound	Penetration Fusion	Burn Off of Electrode	Appearance of Bead
Normal Amps., Normal Volts, Normal Speed Fig. 1	Sputtering hiss plus irregular energetic crackling sounds	Fairly deep and well defined	Normal appearance, Coating burns evenly	Excellent fusion —no overlap
Low Amps., Normal Volts, Normal Speed Fig. 2	Very irregular sputtering, few cracking sounds	Not very deep nor defined	Not greatly different from above	On top of plate. Note there is not the overlap such as is on bare rod
High Amps., Normal Volts, Normal Speed Fig. 3	Rather regular explosive sounds	Deep—long crater	Coating is consumed at irregular high rate —watch carefully	Broad rather thin bead— Good fusion
Low Volts, Normal Speed, Normal Amps. Fig. 4	Hiss plus steady sputter	Small	Coating too close to crater. Touches molten metal and results in porosity	Sits upon plate but not so pronounced as for low amps. Somewhat broader
High Volts, Normal Speed, Normal Amps., Fig. 5	Very soft sound plus hiss and few crackles	Wide and rather deep	Note drops at end of electrode. Flutter and then drop into crater	Wide—Splattered
Low Speed, Normal Amps., Normal Volts Fig. 6	Normal	Crater normal	Normal	Wide bead— overlap large. Base metal and bead heated to considerable area
High Speed, Normal Amps., Normal Volts Fig. 7	Normal	Small, rather well-defined crater	Normal	Small bead— undercut. The reduction in bead size and amount of undercutting depends on ratio of high speed and amps.

wide and considerably overlapped and the base metal and the bead are heated over a considerable area. Note that this corresponds to the heating of the electrode part way up when you have low speed on the bare electrode. If the speed is increased too high (See Fig. 7), then we have normal arc sound, rather small crater, the performance of the electrode is normal but the bead itself is small and undercut. This bead size and undercut vary with the speed and the current. It is to be noted that in the case of the shielded arc that only in one case, that is, where the voltage is too low, is the quality of the weld metal particularly undesirable. In all other cases the deposit of weld metal, that is the actual metal deposited, is a satisfactory quality. However, the joint is not particularly good in those cases where you might have undercutting or overlap, but the weld metal itself is good.

A little practice, varying one after another of the components of good welding procedure, will enable the operator to tell instantly whether or not he is producing a good weld, and if not, just what he is doing incorrectly. Try these tests and see how easy it is to tell a good strong weld from one improperly made.

Shielded Arc Electrodes

Characteristics of welds made with shielded arc electrodes are shown in Table 2.

New York Ass'n Meeting

(*Continued from page* 33)

surance, declared that the New York State fund today is the largest fund in the country, despite the fact that in New York State alone there are some sixty mutual companies operating. New York State permits groups to set up group funds, and anything over the actual cost of operation becomes surplus and is paid out as dividends.

Mr. Gorman pointed out that the New York State association, as a body, might form an insurance group keeping out those contractors who have a very bad accident record, and that if this group can show a minimum of $50,000 per year, total premium the group can be included as an organization and its insurance rating set according to the accident record of the group. Under the group plan each individual firm has a separate account and gets a dividend according to the group record.

Legislation

Active discussion centered around the proposed change in the New York State ventilation law which would practically eliminate all central ventilating systems employing ducts and fans and substitute therefore units placed in the room drawing air directly from outdoors to the air conditioning unit. The New York State association passed a resolution that ventilation laws should not be placed under the control of the school board and that the proposed change should be condemned since it places the control of ventilation in the hands of persons or groups who have no direct interest and know nothing about the problem of proper school ventilation.

Senate Bill No. 174 also came up for discussion. This act, commonly known as the Garrity bill, defines air conditioning and sets up a state board of standards and appeals which has the power to make, amend and appeal rules and regulations with

(*Continued on page* 78)

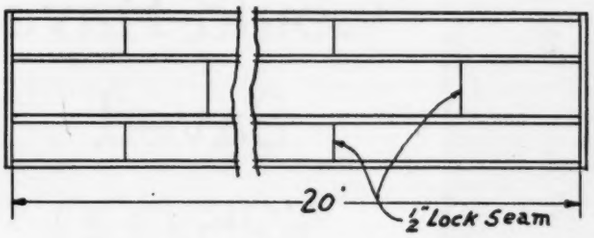
Your comment or experience is invited.

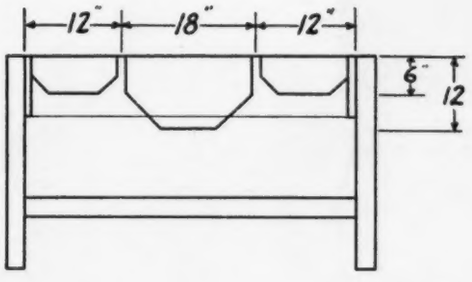
THE PROBLEM CORNER

Soldering Stainless Steel

American Artisan:

We enclose a sketch of some troughs built for a canning factory. We have had trouble with the soldered joints leaking. These troughs are made of 26 gauge, 18-8 with two





18-8 STAINLESS STEEL
SEAMS SWEAT SOLDERED

joints in each section with ½ lock seams, sweat soldered. We have used special stainless steel solder, but still have leaky seams?

H. D. C., New York.

◆

Reply by The Editors

A great deal of stainless steel is soldered, using either 50-50 solder with a large iron or one of the special solders containing a chromium content. You can obtain such solder from almost any jobber.

However, all manufacturers of stainless steel recommend the use of welding where possible as the low conductivity of stainless steel makes soldering somewhat difficult. Having only the information you supply, we can only offer the suggestion that if you have successfully soldered stainless steel and are now having trouble, it may be that the particular material you use has a different metallurgical content than the stainless steel you have been using, as instances have come to our attention where the mill or jobber shipped a different analysis steel without notifying the dealer, because there is nothing in the appearance to indicate difference.

Or, it may be that this particular item is being subjected to unusual strain and stress and if this is the case, then we would recommend welding by all means as solder joints do not stand up under strain as well as welded joints.

Editor,
American Artisan

I have read all the material in the March American Artisan, on Basement Recreation Rooms as I follow this class of heating in my location. I have several recreation rooms in residences heated to the satisfaction of my customers; at a reasonable temperature, between 68 and 73 degrees, and on all types of forced air. I believe Mr. John W. Norris, has the right information, although he has left out one thing—that he must take return air from the basement the same as other parts of the house. I have followed the plan the past three winters of figuring the entire cellar walls as exposed wall, and using the regular calculations, then add 50%; but take the same amount of cold air back to my return side of furnace.

These basement rooms are the same as any other room, except they are a little damper. If you have a recirculation of air, you will get the same results as you do from first floor or second floor rooms. If you put so much air into a room you have to take out the same amount, or at least a portion, to prevent the room from getting too full, and thereby working against the problem you are trying to solve.

John F. Trostle,
Cumberland, Md.

◆

American Artisan:

With reference to the article November Dirt Problem a customer of mine had installed a different make of heater with blower and stoker fired—and he has had considerable trouble—even to the point of calling in the manufacturer's representative. They papered all the lines, even welded the only joint, etc. I called them on the phone tonight and told them about the fire place. And this job has two of them.

We must all work together in this business, mutual assistance is the word.

Charles Hall, Jr., Manasquan, N. J.

◆

American Artisan:

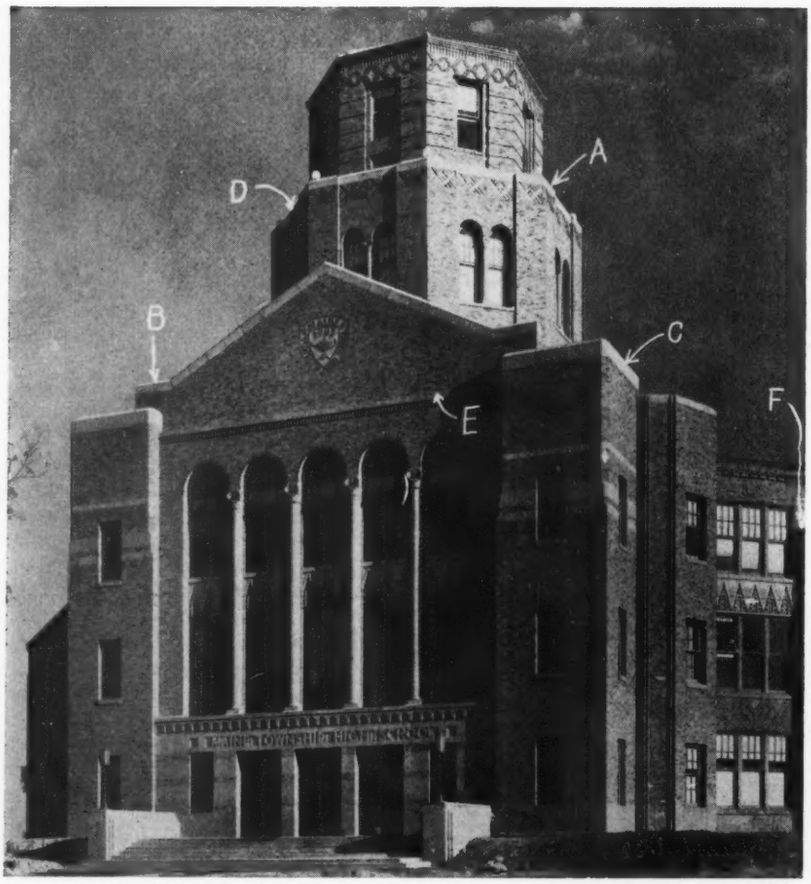
I see the note in the March Problem Corner from W. H. M. As I have never had a complaint on a so-called forced air job not heating rooms perhaps my suggestions will be helpful.

I use 6 x 12-inch base board registers—3½ x 12-inch duct or 7-inch round pipe. I do not use so-called trunks. (I don't take largest homes). In larger houses (two-story) not over 9 or 10-inch pipes. I generally use 2 or 3 warm air pipes in L-shaped room. I use an old rule from gravity installations—less 30% in size for blower. I always stagger my warm air pipes and cold air returns (generally C. A. in floors—6 x 14-inch) meaning hot pipe not directly opposite C. A. grill.

I refuse to put registers 6'-6" upon walls, too much draft, registers blacken. Velocity streaks ceiling, paint gets discolored on walls.

I over size gas furnaces over standard Code rating, have used Hold Heat blowers exclusively. Can be speeded up for summer cooling here (not much hot weather). Mostly stuffy rooms and smoke at parties.

F. W. Haase, Denver, Colo.



Front of the building showing points at which water penetration caused damage within the structure. Closeups of the points designated are shown on the opposite page.

$500 Worth of Flashing Could Have Saved $25,000

IN 1932, the school board of Maine township, Illinois, opened its new $1,500,000 township high school. The imposing building, designed by John D. Chubb, architect, is one of the middle west's finest examples of educational facilities. But trouble developed in the masonry construction—water penetration began to occur resulting in leaks through the walls and defacement of plaster in the tower section and stair wells.

During 1933 to 1937 repairs had to be made each year. Tuck pointing, recaulking and waterproofing had to be carried on along parapet walls, at pilasters and buttresses. While these annual repairs served to temporarily alleviate trouble, permanent elimination was not obtained. In August, 1937, the school board decided to go to the bottom of the problem and remove the source of the water penetration.

Where Penetration Occurred

Investigation disclosed that under coping stones, at gables, at belt courses, water was working through the masonry and finding paths into the building. The problem was to block off these water paths and direct the water out of the masonry. The most satisfactory method insuring permanent elimination of trouble was the incorporation of self-draining, through-wall flashing.

Accordingly, all coping stones were removed from parapets and buttresses; walls were rebuilt where needed; gable copings were removed; all set back walls were torn down to the point where water was entering the walls. After removal of masonry and brick, self draining, through-wall flashing was installed in accordance with practice recommended by the Treasury Department specifications for U. S. buildings and the Cheney company.

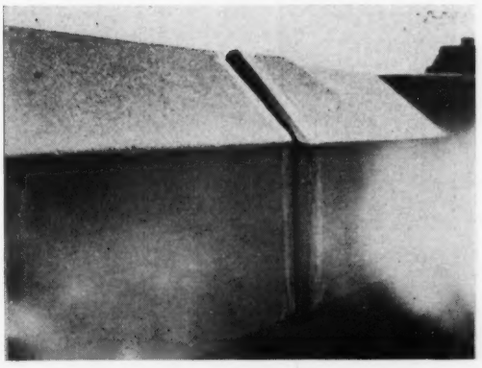
The points of most trouble are diagrammed on the exterior photograph. The flashing as installed at these points is shown in the details. Conditions of the walls before the 1937 repairs were completed, are shown in the small photographs.

Repairs Prove Expensive

When the work was completed a cost record of the trouble was plotted. The total expenditure for repairs as mentioned previously plus the cost of the 1937 masonry replacements and flashing contract exceeded $30,000. The total cost of the flashing used to effect permanent cure was less than $500. If this flashing protection had been included originally the saving would have been at least $25,000—no mean saving in these days of troublesome school finances.

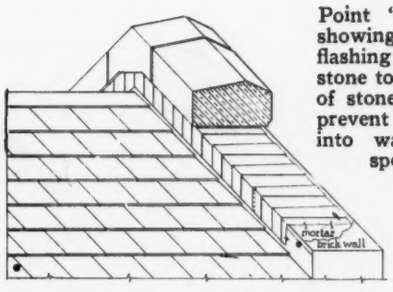
The sheet metal contractor who installed the flashing was Heimsoth and Held Co. of Desplaines, Illinois. The masonry contractor was Carl G. Dencker, of Desplaines.

Closeup of point "A" showing frost damage to coping stone joints and point of penetration at stone-brick horizontal joint. Water found its way into the tower room.



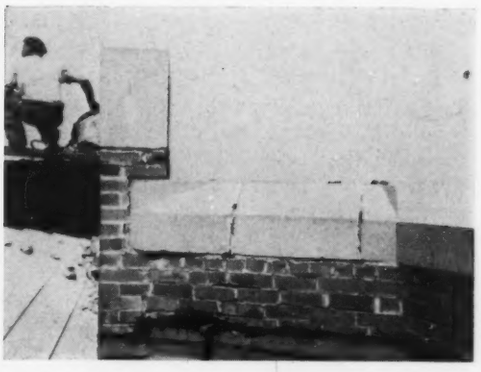
Point "A" showing application of through wall flashing between stone and brick work and wall flashing down face of the parapet. (Cheney specification.)

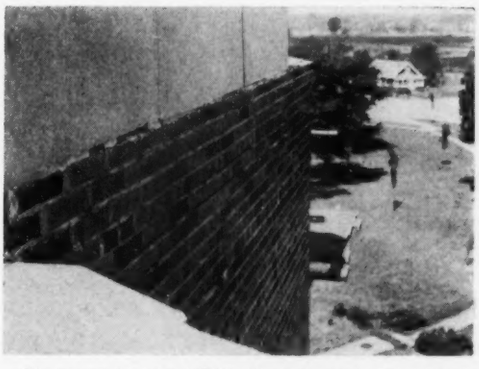




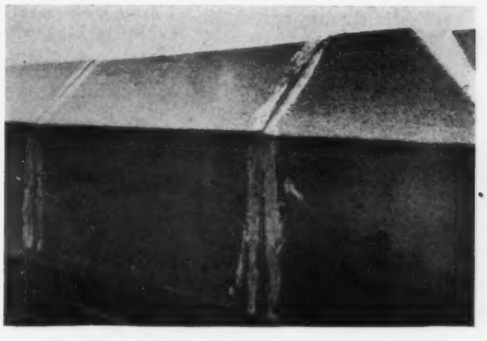
Point "B" diagram showing through wall flashing under gable stone to carry water out of stone-brick joint and prevent water working into wall. (Cheney specification.)

Closeup of point "B" showing damage to masonry from water and frost. Note how mortar has been pushed out of stone and brick joints.

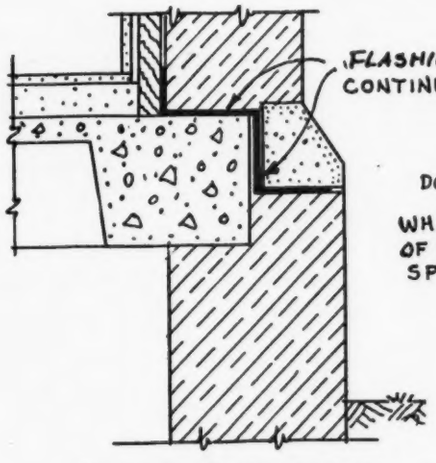




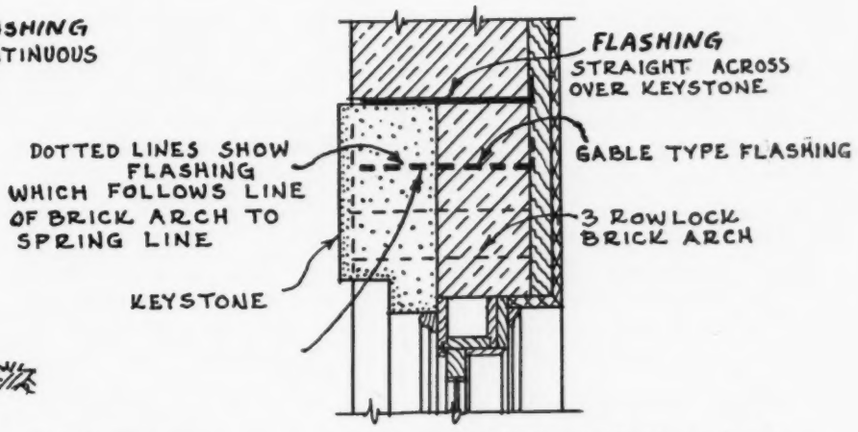
Closeup of point "C" where frost had broken mortar out of stone-brick and brick joints permitting water to seep into stair tower rooms. Note bad spalling of mortar.



Closeup of point "D" where water worked down through stone joints into parapets and then into inside walls. Picture taken after numerous repairs.



Cheney specification for flashing at belt courses or water tables such as point "E." On this building interior plaster damage resulted from penetration at point "E."



Cheney specification for flashing at top of buttress. On this building buttresses had to be torn down for several feet to seal brick joint. See point "F."

Arnold Kruckman's Washington Letter

DAVID LYNN, Architect of the Capitol, casually, at lunch in the Senate Restaurant the other day, remarked that over 500,000 pounds of sheet metal had been used in refurnishing the Capitol during the past year. People out through the country do not often hear about Mr. Lynn. He keeps the physical condition of the Capitol in order, and plans, as well as supervises, its improvements. Among many other duties, he also controls the use of the various parts of the great building. The job of Architect of the Capitol has been in existence from the time they began to plan the Capitol, April 5th, 1793. And it may interest the people of the heating industry to recall that the first architect of the Capitol was Latrobe, whose name also is identified with the very earliest technological activities connected with heating and air-conditioning in the United States.

Most Precise A. C. Plant

Government people believe the most precise air-conditioning unit in existence has recently been installed at the Bureau of Standards. The Bureau of Standards is, presumably, the Supreme Court of technology in the United States. "Standards," as it is affectionately known in the Capital, is located about five miles away from the White House, up near Chevy Chase, close to the Maryland line. The group of buildings that contain the many laboratories and studies of the Bureau are situated on a wooded knoll fronting on Connecticut avenue. Visitors are always welcome, especially men and women interested in any trade or technology.

This air-conditioning unit, with the unique precision, operates in a small room about two feet wide, ten feet long, and eight feet high. Temperature may be controlled within one-tenth of a degree, and humidity is controlled within one-tenth of one per cent. The equipment is the well known type which uses hot and warm air. The little air-conditioning test chamber was built to observe radio tubes used by the Navy. Delicate variations in temperature and humidity are required in order to reproduce the conditions that exist under the sea, as well as at the various altitudes in which aircraft travel. A vast amount of incidental data is being accumulated by the investigators. Information that is not essential solely for national defense will be available to technicians in the industry. If you harbor any questions, or if you have an idea for any particular test under the ideal conditions available at the Bureau of Standards, write to the Director of the Bureau of Standards, mentioning this article by way of identification.

It is reported the equipment now in use may be modified. The noise made by entering air has seriously interfered with the experiments. A change is contemplated to the type of equipment used in the air-conditioning unit installed at the Bureau of Agricultural Economics, reported in these columns last month. The BAE unit is being made by the Research Corporation, of New York City. This organization competes in the market with all other air-conditioning industries. The understanding is that it competes on ordinary commercial lines, charging the usual commercial prices. It accumulates profits like other commercial enterprises; but it does not distribute the profits, or earnings as dividends. It has no stockholders. The earnings are distributed during the course of each year to men and women who are conducting some form of research to extend the boundaries of human knowledge. In the past ten years alone the Corporation has distributed over $1,000,000 of its earnings.

How Research Corp. Works

The Research Corporation has points of interest that should particularly interest the readers of the AMERICAN ARTISAN. It was founded over 25 years ago by Dr. Frederick G. Cottrell, one of the world's great chemists and inventor of the Cottrell Precipitation System, a method of applying electrolysis to separate particles, theretofore apparently insoluble. At one time chief of the U. S. Bureau of Mines, where he was largely, but obscurely, responsible for devising the method by which helium was made economically available, Dr. Cottrell felt his patents should be used for broad human welfare. The Research Corporation was founded upon the patents. The original idea was that the earnings should be used to aid worthy inventors to perfect their devices. The activities of the Corporation have for the time been switched on a by-pass, but the facilities of the Corporation are still available to inventors. It is customary to support an inventor comfortably during the period while his invention is being perfected and marketed, and to turn over the profits or the going-business to the inventor, under proper safeguards, when the patents or the patented product have been established.

How Much for Heating

The Department of Labor estimates that 1 2/10c are spent with the sheet metal trade out of every dollar expended on building. The least optimistic Government people calculate that this means recent loans guaranteed by the FHA will put between nine and ten millions of dollars into the pockets of the sheet metal industry. Loans run

(*Continued on page 75*)


VOTED

RESIDENTIAL AIR CONDITIONING SECTION

THE coming cooling season seems likely to be a critical period in cooling history. Intensive drives will be made to cool small spaces with unit machines which require no duct work, no centralized equipment. The "big" jobs probably will go to the direct selling manufacturers who also install, or sub-contract installation.

This leaves the small commercial and residential market to the "so-called" air conditioning contractor who recommends and installs central systems with air distribution through ductwork.

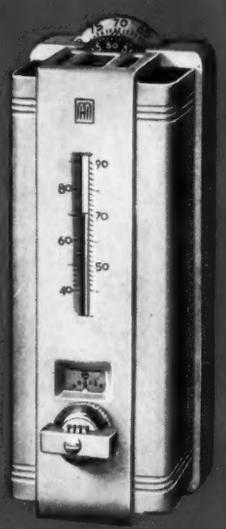
It is our conviction that experience and tests conclusively show the central system with duct distribution is the least wasteful of space, insures the most comfort throughout the space cooled, and offers most real value for the cost involved.

On this premise, articles on cooling during coming summer issues will deal largely with the problems of systems of this type.

A Little More makes a Big Difference!

GIVE YOUR CUSTOMERS THE ADDITIONAL ADVANTAGES OF LOWERED NIGHT TEMPERATURE

THE M-H Da-Nite Acratherm lists at only $10 more than the Acratherm – but what a difference. Its advantages are readily apparent. In the first place the Da-Nite Acratherm offers the same accuracy of control as the Acratherm which is made possible only by the exclusive M-H principle of "Heat Acceleration." In addition, it gives your customers the economy of manually lowered night temperature with automatic return in the morning. This results in savings of 3.2 percent per degree during the time the night temperature level is in effect. Selling the Da-Nite Acratherm with every job will also give you an extra profit. And the slight difference in cost to your customers will be more than offset in a short time by the fuel saving effected. Equip your installations with the Da-Nite Acratherm. Your customers will appreciate the difference. Minneapolis-Honeywell Regulator Co., 2726 Fourth Ave. So., Minneapolis. Branches and distributors everywhere.



THE DA-NITE ACRATHERM

MINNEAPOLIS-HONEYWELL

NATIONAL PNEUMATIC CONTROLS
BROWN INDUSTRIAL INSTRUMENTS

AUTOMATIC CONTROLS MH

Control Systems

An Inventory of Attic Ventilation in Southwest Cities —Dallas, Texas—

DURING the past four years a comprehensive volume of information has been published in AMERICAN ARTISAN covering all aspects of cooling by ventilation—more commonly called attic ventilation or night air cooling. The Research Residence staff at the University of Illinois has run tests using a large capacity fan in the attic and the furnace basement blower and as most readers know has reported at length on all phases of the method.

In the city of Detroit, Michigan, the Detroit Edison Company has actively investigated night air cooling and in several houses has kept accurate records of the operation of the system and the results obtained. A complete report of the Detroit Edison program was published in the January, 1938, issue of AMERICAN ARTISAN.

In addition to these reports by accepted agencies, contractors in many parts of the country have installed night air cooling or attic ventilation systems and the results have been reported during the past three years.

Basic Cooling Data

All results point to the conclusion that night air cooling or attic ventilation is advantageous and practicable. For conditions obtaining similar to those of Urbana, Illinois, the University of Illinois summarizes cooling by ventilations as follows:

1. The circulation of air from the outdoors at night, when used as a supplement to artificial cooling during the day, has considerable merit in reducing the seasonal cooling load that would otherwise be required.
2. The circulation of air from the outdoors at night may make the use of artificial cooling unnecessary for a considerable portion of the summer season.
3. If the best means of circulating air from the outdoors at night had been used at the Research Residence during the summer of 1932 the ice meltage could probably have been reduced from the 43 tons actually used to an amount of the order of 10 tons.



The Electrical
MERCHANDISER

DALLAS APRIL . 1937 . TEXAS

ATTIC VENTILATION GROWING IN POPULARITY

The Attic Ventilation program of Dallas dealers last year was so successful that an even more intensive effort will be directed toward the sale of this type of equipment this summer. The long summer season in this territory and the relatively low cost of Attic Ventilation, with complete installation, varying from $150 to $350, enhance the possibilities for this promotion.

Present users are unanimously enthusiastic about its benefits and are taking a real pride in having prospective users inspect the installations in their homes.

OPPORTUNITY FOR DEALERS

Dealers in electrical equipment and now handling Attic Ventilation may be interested in the remarkable opportunity for sales and profits this activity offers in Dallas this summer. The Attic Ventilation system is priced to allow a good profit, even where the installation work, is let out to contractors. The system is so simple that maintenance and repair are at a minimum, and so effective that complaints or kick-backs are practically unknown. The idea of Attic Ventilation is comparatively new, even in a young industry, and the principle is so logical and easily understood that converts are easily made. The field is not highly competitive and the market may be considered virtually untouched, although sales in Dallas have more than doubled yearly since the first installation was made in 1930.

DEALER AND POWER COMPANY PROMOTION

The Dallas Power and Light Company, while making neither sales nor installations of Attic Ventilation, is very actively engaged in its promotion here. Four specialists in the field will devote full time to this activity, assisting the dealers in the training of salesmen, the securing of prospects and in the closing of sales. An aggressive campaign will be coordinated with this activity, using newspapers, bill boards and screen advertising, as well as various other media.

HOW IT OPERATES

In discussing Attic Ventilation with the prospect, little difficulty will be experienced in explaining its operation. Almost everyone realizes that considerably higher temperatures exist in the average attic as compared with the living quarters of the house and that the effective temperature in those rooms can be reduced to a great extent by periodically replacing the air in the attic and thus carrying out the heat conducted through the roof. The system provides for a large fan, properly located in the attic, to draw the cool evening air in through windows and doors and up into the attic, driving the hot blanket of stagnant air out of the house.

A TYPICAL INSTALLATION

The typical installation consists of a large vibrationless type of exhaust fan mounted on the floor of the attic. A grille opening is made in the ceiling directly under the back section of the suction box, and the edges of the box around the opening are fixed with a material which will give an airtight connection between box and attic floor. A positive suction between the fan and the rooms below is obtained in this manner. The grille, made of wooden slats or of expanded metal lath, should be of sufficient size, and with enough free area, so as not to restrict the air flow through it. The most desirable location for the grille is in a centrally located hall; if in a two story house, close to the stairs. The exhausting of the air to the outside requires suitable openings in the attic, either window dormers, louvers, or roof ventilators. The most efficient arrangement includes openings on all sides, thus lessening chances of pressure which would lower the efficiency of the fan.

SELLING ATTIC VENTILATION

In introducing a new development of this kind, the dealer, his salesmen, and all promotional agencies should be careful to present a clear, accurate picture of what Attic Ventilation can be expected to do. Experience shows us that whose impossible claims are avoided in making the sale, where a fan of ample size and efficiency is chosen, and where reasonable skill is applied in the installation, the results will give satisfaction without exception.

SURVEY MADE BY SALES

If the prospect seems at all interested, it is a wise move to ask permission to make a survey of the home, to determine the cubical content, the size fan required, and an estimate of the work and material needed to complete the installation. The salesman can then quote a price for the complete job, which of course will vary with the size and type of the house. Operating costs of such installations will vary from 5¢ to 10¢ per day. Maintenance costs will be practically negligible.

ATTIC VENTILATION FOR NEW HOMES

New home builders are particularly good prospects for Attic Ventilation, as the system can be included in the architect's plans at very little extra cost. Architects and builders have recognized the fact that Attic Ventilation is a means of providing flexibility in house design without sacrificing good ventilation, while building developers have found it a valuable selling feature. Dealers will find in new home construction a very profitable source of new business in 1937 and succeeding years.

Front cover of monthly magazine reaching 61,000 customers and contractors. A monthly report of the campaign was tabulated on the back page.

4. The practice of partly opening a few windows at night is not very effective as a means of circulating air from the outdoors.
5. The use of a fan in a forced air heating system to circulate from 6 to 9 air changes per hour from the outdoors at night is much more effective than opening a few windows even when the same amount of window opening is retained for the two cases.
6. The use of a fan in a forced air heating system to circulate 9 air changes per hour is more effective if all of the windows and the attic door or hatchway is opened than if only a few windows are opened.
7. The most effective method of circulating air from the outdoors at night is to open all of the windows and to use an attic fan drawing the equivalent of approximately 17 air changes per hour into the windows of the first and second stories and discharging it into the attic to escape from the attic windows.
8. In the case of a two story house similiar to the Research Residence having an ample attic with dormer windows and large attic door, opening all of the windows and the attic door is nearly as effective for circulating air from the outdoors at night as the use of an attic fan producing approximately 17 air changes per hour.
9. There is some advantage in opening the windows at 6 p. m. rather than at 9 p. m. even if the outdoor temperature is slightly higher than the indoor temperature at 6 p. m.

Reports of 120 Air Changes per Hour

During the years this type of comfort cooling has been gaining advocates in the northern part of the country where night temperatures drop considerably below day temperatures, reports have been received that down south, where day temperatures



One side of a single page (cardboard) mailing piece sent to commercial customers and preferred home owners. The return card requests free engineering and survey service. The reverse side contains a strong appeal to investigate.

are much higher than Urbana and night temperatures oftentimes do not drop very many degrees, a greatly different type of comfort ventilation has become established.

The chief difference seems to be that much larger air quantities are circulated and, secondly, that cooling at night is secondary to 24-hour ventilation of the entire house. Air quantities as high as two changes per minute—120 air changes per hour—are not uncommon as owners wish a noticeable breeze of air sweeping through all rooms, 24 hours a day.

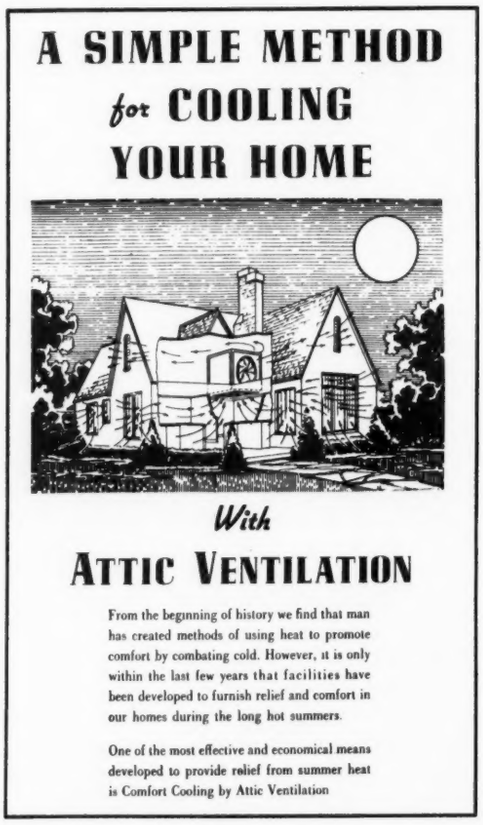
In an effort to substantiate these reports, a field trip was made last fall through cities in Oklahoma, Nebraska, Texas and Louisiana. Contractors, utility companies, engineers, home owners, were interviewed; actual installations were visited and examined; engineering data was checked and rechecked. The information which follows, presented by cities, explains design characteristics; the sales programs employed; the number of jobs sold; what, briefly, are the particular problems of design and sales in the cities showing market acceptance of the idea.

Dallas, Texas

In Dallas, Texas, the Dallas Power and Light Company, has been actively advocating the use of attic fan systems for three summers. During the first summer, 1935, only a limited amount of promotion was used. By 1935 several sales organizations handling attic ventilation as a side line and a few firms specializing in ventilation had become established. The total number of installations made up to the end of 1935 was not large, but a good groundwork had been laid.

In 1936 under the sponsorship of the Dallas Power and Light company an intensive campaign was launched. The number of cooperating sales firms was increased to include sheet metal, radio, electrical, heating, ventilating firms as well as organizations selling only attic ventilation. Some literature was prepared by the utility company and space was used in The Electrical Merchandiser, the utility's paper to the electrical trade. A limited amount of newspaper space was purchased and some billboard advertising was used.

The net result for 1936 was 122 systems sold and accounted for at an estimated total installed value of $24,400, about double the volume and number of installations made in 1935.



The key mailing piece of the campaign was an elaborate, 24-page booklet, "Comfortable Living." Nine satisfied home owners were quoted; their homes were shown; and addresses given. This is the first text page.

With all the facts available and public acceptance cemented, a very complete campaign was launched in 1937. This program consisted of a greatly increased number of firms selling and installing attic ventilation systems; increased space in newspapers and local magazines, billboard space, moving picture theatre shorts, more elaborate literature to be mailed to a large number of utility customers.

Advertising of all types was planned as follows: During May one week's advertising in newspapers

was devoted to cooling; one advertisement was scheduled for the magazine Dallas Hospitality. For June newspaper advertising was scheduled for one week; two magazines (Dallas Hospitality and Your Electric Ally) carried advertisements; moving picture theatres used screen shorts. In July one week was given to cooling in local newspapers; the same two magazines carried advertising; billboards and truck signs, utility bills, cancellation stamps and package enclosures featured home cooling. The movie shorts were continued in a larger number of theatres.

In August newspaper advertising was discontinued, but the two magazines carried space equal to July. All billboard, truck and package enclosures were stopped, but the screen shorts were continued. For September all publicity and advertising promotion was stopped.

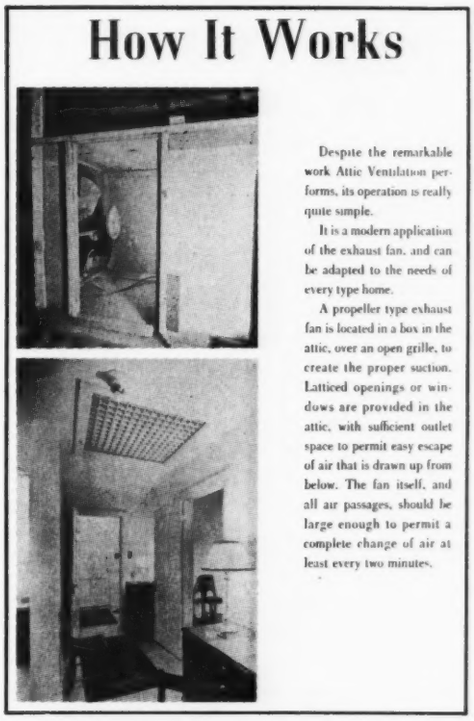
As the program for 1937 shaped up in the spring, dealers were brought into meetings at which publicity was discussed. In April about two dozen firms had laid plans for active cooperation. And in April 9 firms reported sales of 15 units. In the April issue of The Electrical Merchandiser, page 1



Page 3 explains pictorially why a cooled attic means night comfort; also why circulation of large quantities of air is essential.

was devoted to a summary of attic ventilation. This publicity was aimed at increasing dealer interest and enlisting more firms in the program.

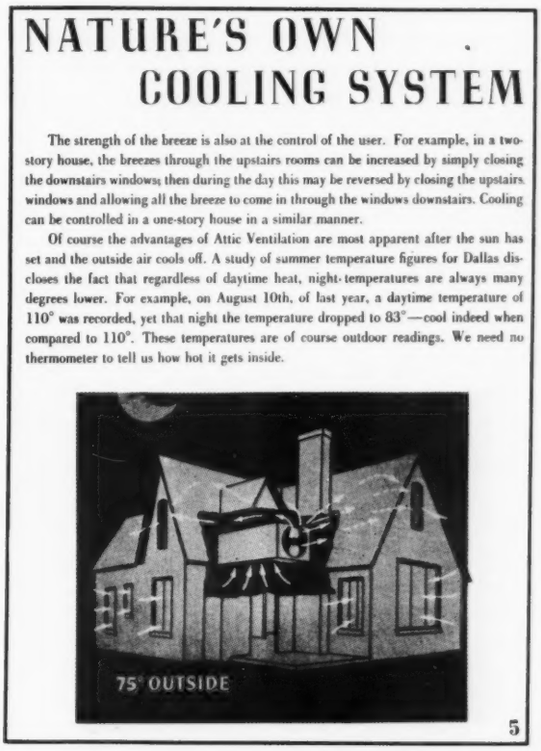
As a result of this promotion, May showed a list of 29 active dealers with announced plans for cooperation and individual effort. In summarizing the



The pictures on "How It Works" page are intended to show how simple an attic ventilation system is. Also this shows a typical Dallas installation.

effort for the summer the utility announced that the company would sell no merchandise nor make any installations—this would be left to the dealers. The

(*Continued on page 76*)



It was necessary to explain to home owners that temperatures drop after sundown; and how much of a drop there is; and why this phenomenon can be taken advantage of. Here is the page that accomplished the task.

Precalculated Engineering

In the March issue the author began discussion of that controversial subject—infiltration. This article compares infiltration losses established from Precalculated Engineering tables with losses calculated by customary "crackage" or "air change" methods. Heat loss sheets are now available.

By G. A. Voorhees

Consulting Engineer,
Indianapolis, Ind.

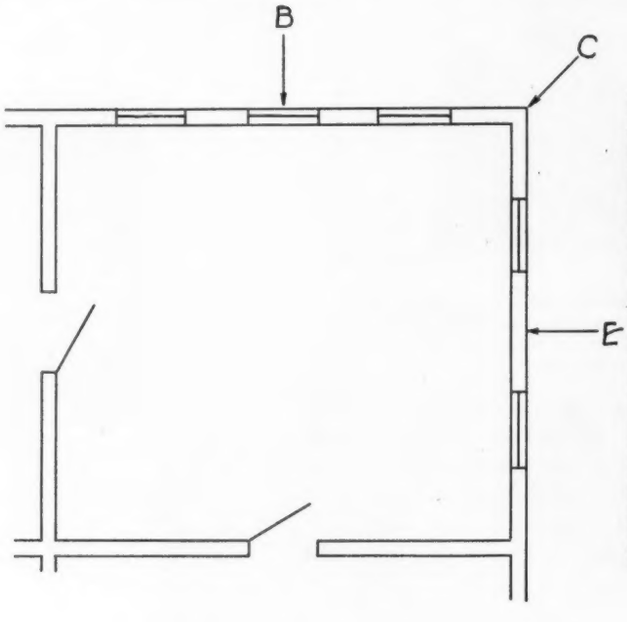
FOR a number of years many careful engineers have added an *exposure factor* of 15 per cent to the calculated heat losses of those rooms which have been assumed to be exposed to prevailing wind, the direction of this prevailing wind being found from records of the nearest Weather Bureau station. But the wind recording instruments at any Weather Bureau office are usually located as far above ground level as possible so the recorded air current velocity and direction will be least affected by nearby buildings and other obstructions. Consequently the wind characteristics as obtained from the Bureau are of doubtful value to the designer of domestic heating plants.

He's not interested in air movement fifty feet or more above the surface of the ground. It's the direction and velocity within twenty or thirty feet of the ground that affects infiltration in the average residence. Two houses in the same locality for instance, *may* receive their "prevailing" winds from different directions because of groves of trees, ground surface contours or nearby buildings which deflect the surface air currents.

Furthermore, the direction of the prevailing wind may not be the direction of the coldest wind; nor is it necessarily the direction from which the wind blows at highest velocity—and a high velocity wind at a moderately low temperature will chill a room on the windward side of a house more than a much colder wind at low velocity.

All of these variations and uncertainties have led many engineers to abandon their former practice of adding 15 per cent exposure allowance to *only* those rooms having north-west or some other arbitrarily chosen direction of exposure. Instead, there seems to be a growing tendency to add such an exposure allowance to *each room which has two or more sides exposed.* This insures ample heat delivery to every "exposed" room regardless of erratic changes in wind direction and velocity.

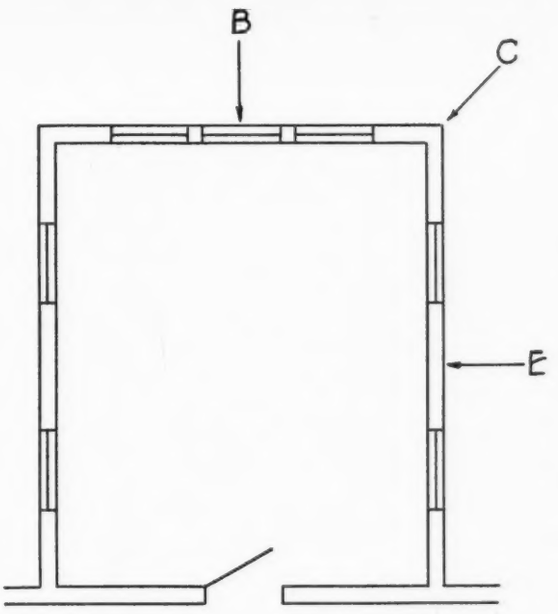
During the several years that the accompanying precalculated heat loss tables have been in course of



Room		Dimensions	14X16	
Construction of exposed wall			Stucco frame	
Table No.	4	Ceiling height	9	Heat loss
Running feet exposed wall			30	5.7
WINDOWS Type	Dimensions	No.	Equiv. No. of standard windows	
Plain	2½X5	5		8.9
Outside doors	Type	none		
Cold ceiling		Dimensions none		
Cold floor		none		
Heat loss for 70-degree temperature difference				14.6
Corresponding heat loss for Temp. Diff. of		degrees		

Fig. 2

Room with two sides exposed and data sheet showing total heat loss by precalculated method.



Room		Dimensions 12X14		
Construction of exposed wall Stucco frame				
Table No. 4		Ceiling height 9		Heat loss
Running feet exposed wall 40				7.6
WINDOWS Type	Dimensions	No.	Equiv. No. of standard windows	
Plain	2½x5	7		12.5
Outside doors	Type none			
Cold ceiling	none	Dimensions		
Cold floor	none			
Heat loss for 70-degree temperature difference				20.1
Corresponding heat loss for Temp. Diff. of degrees				

Fig. 3

Room with three sides exposed and seven windows and data sheet showing total heat loss by precalculated engineering method.

development, trial and revision, it has become apparent that in their present form (in which it is assumed that infiltration takes place at *every* window), the tables more or less "automatically" take care of the desirable exposure allowance of approximately 15 per cent as indicated by the following examples:

Fig. 2 shows a room 14 ft. by 16 ft. (total, 30 ft. of wall) with 9 ft. ceiling and having two sides exposed with three windows in one side and two in the other. The walls are assumed to be of frame construction; outside finish, stucco on wood sheathing; inside finish, lath and plaster; heat transmission coefficient (construction No. 14 in accompanying Table 4) is 0.30 Btu. per square foot, per degree temperature difference, per hour. Heat loss of wall = 5.7 or 5,700 Btu. (Table 4).

Assumed inside-outside temperature difference, 70 degrees.

Windows, double hung, wood sash with neither weatherstrip nor storm sash; dimensions, 2 ft. 6 in. wide by 5 ft. high. Each such window has 12.5 square feet of area and 17.5 running feet of crack. Total heat loss of glass (Table 4) equals 8.9 or 8,900 Btu.

The data sheet (Fig. 2) shows that according to Table 4, the total heat requirement of the room is 14.6, meaning 14,600 Btu. per hour. For comparison, the following tabulation is given to show the result of the more precise method of determining the heat loss of this room by calculation:

Gross exposed wall surface.....(14 + 16) × 9 = 30 × 9 = 270 sq. ft.
Glass surface .....5 × (2.5 × 5) = 5 × 12.5 = 62.5 sq. ft.

Subtracting to get net exposed wall surface..... = 207.5 sq. ft.

Since the transmission loss through single glass is 1.13 Btu. per square foot of surface, per degree temperature difference, per hour and the transmission through the type of exposed wall assumed in this case is 0.30 Btu. per square foot per degree difference per hour, the total transmission heat loss for this room is:

Glass surface .....62.5 × 1.13 × 70 = 4,944 Btu per hour
Net exposed wall .....207.5 × 0.30 × 70 = 4,358 Btu per hour

Total transmission heat loss..... = 9,302 Btu per hour

To make an intelligent comparison between the precise calculation method and the tabular method of finding the heat loss, it must be assumed in the calculation that the air leakage amounts to 47 cubic feet per hour per running foot of crack since this is the infiltration rate assumed in compiling the tables for the reasons given in the first article of this series (January).

Following the commonly accepted rules for determining the number of running feet of crack to use in figuring infiltration as given in the new Technical Code for Mechanical Heating, the present calculation takes into account only the crackage in that side of the room having three windows.

On this basis, the calculated infiltration heat loss will be:

52.5 × 47 × 0.075 × 0.24 × 70 = 3,109 Btu per hour.

in which

52.5 = number of running feet of crack in three windows having 17.5 feet each
47 = assumed rate of infiltration (cubic feet of air per hour per running foot of crack)
0.075 = weight in pounds of one cubic foot of air at room air temperature of 70 degrees
0.24 = Btu required to raise the temperature of one pound of air, one degree Fahr.
70 = difference in degrees between temperature of room air and infiltering air

The total heat loss according to the accepted calculation method is:

Transmission loss ..... 9,302 Btu per hour
Leakage loss ..... 3,109 Btu per hour

Uncorrected total ..... 12,411 Btu per hour
Plus 15% exposure allowance..... 1,867 Btu per hour

Total calculated heat loss..... 14,278 Btu per hour

Notice that after the customary and desirable 15 per cent exposure allowance has been made in the calculation, the total heat loss is found to be 14,278 Btu. per hour in comparison with the much easier and quicker precalculated table method which gives 14,600 Btu. per hour, a difference of only a little more than 2 per cent.

The tables and the calculation do not always agree as closely as in the foregoing example. Fig. 3 shows a room with three sides exposed; 12 ft. by 14 ft. with

TABLE 4 [Heat Transmission Coefficient—0.30]

Heat Loss Through Gross Exposed Wall (Temp. Diff. 70 Deg.)

Running feet exposed wall	Ceiling height, feet 8	9	10	Running feet exposed wall	Ceiling height, feet 8	9	10
4	0.7	0.8	0.8	37	6.2	7.0	7.8
5	0.8	0.9	1.1	38	6.4	7.2	8.0
6	1.0	1.1	1.3	39	6.6	7.4	8.2
7	1.2	1.3	1.5	40	6.7	7.6	8.4
8	1.3	1.5	1.7	41	6.9	7.7	8.6
9	1.5	1.7	1.9	42	7.1	7.9	8.8
10	1.7	1.9	2.1	43	7.2	8.1	9.0
11	1.8	2.1	2.3	44	7.4	8.3	9.2
12	2.0	2.3	2.5	45	7.6	8.5	9.5
13	2.2	2.5	2.7	46	7.7	8.7	9.7
14	2.4	2.6	2.9	47	7.9	8.9	9.9
15	2.5	2.8	3.2	48	8.1	9.1	10.1
16	2.7	3.0	3.4	49	8.2	9.3	10.3
17	2.9	3.2	3.6	50	8.4	9.5	10.5
18	3.0	3.4	3.8	51	8.6	9.6	10.7
19	3.2	3.6	4.0	52	8.7	9.8	10.9
20	3.4	3.8	4.2	53	8.9	10.0	11.1
21	3.5	4.0	4.4	54	9.1	10.2	11.3
22	3.7	4.2	4.6	55	9.2	10.4	11.6
23	3.9	4.3	4.8	56	9.4	10.6	11.8
24	4.0	4.5	5.0	57	9.6	10.8	12.0
25	4.2	4.7	5.3	58	9.7	11.0	12.2
26	4.4	4.9	5.5	59	9.9	11.1	12.4
27	4.5	5.1	5.7	60	10.1	11.3	12.6
28	4.7	5.3	5.9	61	10.2	11.5	12.8
29	4.9	5.5	6.1	62	10.4	11.7	13.0
30	5.0	5.7	6.3	63	10.6	11.9	13.2
31	5.2	5.9	6.5	64	10.8	12.1	13.4
32	5.4	6.0	6.7	65	10.9	12.3	13.7
33	5.5	6.2	6.9	66	11.1	12.5	13.9
34	5.7	6.4	7.1	67	11.3	12.7	14.1
35	5.9	6.6	7.4	68	11.4	12.9	14.3
36	6.0	6.8	7.6	69	11.6	13.0	14.5
				70	11.8	13.2	14.7
				71	11.9	13.4	14.9
				72	12.1	13.6	15.1

Wall Types to Which This Table Applies

No.	Type of Wall	Outside Finish	Inside Finish	Heat Trans. Coef.
14	Frame	Stucco on wood sheathing	Lath & Plaster	0.30
22	Brick	8-in. solid brick wall	Lath & Plaster furred	0.30
34	8-in. Concrete Block	Brick Veneer	Lath & Plaster furred	0.30
37	8-in. Cinder Block	Stucco	Lath & Plaster furred	0.28
45	8-in. Haydite Block	Brick Veneer	½-in. plaster on block	0.29

Add For Windows

Type	Number of equivalent windows 1	2	3	4	5	6	7	8	9	10
Plain — no weather strip, no storm sash	1.8	3.6	5.4	7.2	8.9	10.7	12.5	14.3	16.1	17.9
Weatherstrip only — no storm sash	1.5	3.0	4.5	6.0	7.4	8.9	10.4	11.9	13.4	14.9
Storm sash only — no weatherstrip	1.4	2.9	4.3	5.6	7.2	8.6	10.1	11.5	12.9	14.4
Both weatherstrip and storm sash	1.1	2.3	3.4	4.6	5.7	6.8	8.0	9.1	10.2	11.4

9 ft. ceiling and having seven windows each of which is 2 ft. 6 in. wide by 5 ft. high. The accompanying data sheet shows a heat loss of 20.1 (or 20,100 Btu. per hour).

The gross exposed wall area is $(14 + 12 + 14) \times 9 = 360$ square feet. Glass surface is $7 \times (2.5 \times 5) = 88$ square feet. Net exposed wall surface is $360 - 88 = 272$ square feet.

By calculation, the heat losses of the room are:

Transmission loss:		
Glass	88 × 1.13 × 70 =	6,961 Btu per hour
Net exposed wall	272 × 0.30 × 70 =	5,712 Btu per hour
Total transmission loss		12,673 Btu per hour
Leakage loss:		
Total crackage of room is 7 × 17.5 = 122.5		
Half of total crackage is ½ of 122.5 or 61 feet.		
Total crack in side having greatest crack is 3 × 17.5 = 52.5.		
Since half of the total crackage of the room is greater than the crackage in the side having the greatest length of crack, the length used to compute leakage is half of total which is 61.		
61 × 47 × 0.075 × 0.24 × 70		3,612 Btu per hour
Uncorrected total		16,285 Btu per hour
Plus 15% exposure allowance		2,443 Btu per hour
Total calculated heat loss		18,728 Btu per hour

Assuming that the calculated loss of 18,728 Btu. per hour is correct and that the precalculated table loss of 20,100 Btu. per hour is incorrect, it is apparent that the use of the tables result in an error of:

$$\frac{20{,}100 - 18{,}728}{18{,}728} \times 100\% = 7\tfrac{1}{2} \text{ per cent.}$$

One way to look at it is that this error, due to the assumption in the tables that infiltration takes place through *all* windows of a room, is an error in the right direction—that it merely serves to provide an added safety factor.

Another and more reasonable view is that, since such an "error" becomes larger as the number of windows in a room increases, it is in line with the growing tendency to provide higher room air temperatures in those rooms having relatively large areas of glass surface to compensate for the resulting increased loss of radiant heat from the human body. Many engineers make it a fixed rule, for instance, to figure heat requirements of a sun room on the basis of a room air temperature at least five degrees higher than the other living rooms. In cold weather a solarium is seldom completely comfortable if its room air temperature is only 70 degrees. If the other rooms are maintained at this temperature, the sun room should not be kept at less than 75 degrees—and some designers prefer 80 degrees.

To what extent the precalculated tables meet the need for a higher temperature in such a room is indicated by the following example:

Fig. 4 shows a sun room, 8 ft. by 14 ft. with 8 ft. ceiling; three exposed walls of the same construction assumed in the preceding examples; cold ceiling without floor above, no insulation; eight windows 2 ft. 6 in. wide by 5 ft. high with neither weatherstrip nor storm sash.

The accompanying data sheet shows the heat requirement as given by the tables, to be 21.8 or 21,800 Btu. per hour and the corresponding heat loss arrived at by calculation, is as follows:

Gross exposed wall $= 8 \times (8 + 14 + 8) = 240$ square feet. Glass surface $= 8 \times (2.5 \times 5) = 100$ square feet. Net exposed wall $= 240 - 100 = 140$ square feet. Cold ceiling $= 8 \times 14 = 112$ square feet.

Transmission heat loss:

Glass	100 × 1.13 × 70 =	7,910 Btu per hour
Net exposed wall	140 × 0.30 × 70 =	2,340 Btu per hour
Cold ceiling	112 × 0.32 × 70 =	2,509 Btu per hour
Total transmission		12,759 Btu per hour
Leakage loss (70 running feet of crack):		
70 × 47 × 0.075 × 0.24 × 70		4,145 Btu per hour
Uncorrected total		16,904 Btu per hour
Plus 15% exposure allowance		2,535 Btu per hour
Total calculated heat loss for room air temperature of 70 degrees		19,439 Btu per hour

Thus the tabular method of estimating the loss shows a heat requirement which is:

(*Continued on page* 64)

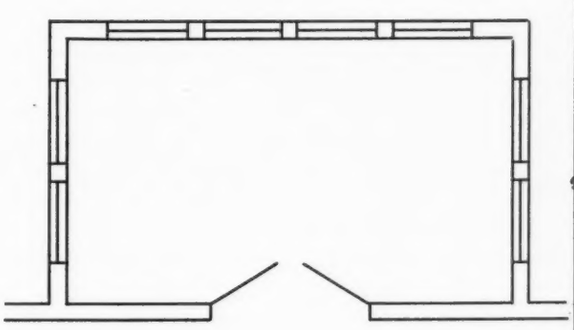


Fig. 4

Sun room with three exposed walls, cold ceiling, warm floor; eight windows and heat loss from precalculated tables.

Room		Dimensions 8 X 14		
Construction of exposed wall	Stucco frame			
Table No. 4		Ceiling height 8		Heat loss
Running feet exposed wall		30		5.0
WINDOWS Type	Dimensions	No.	Equiv. No. of standard windows	
Plain	2½X5	8		14.3
Outside doors	Type none			
Cold ceiling		Dimensions 8X14		2.5
Cold floor	none			
Heat loss for 70-degree temperature difference				21.8
Corresponding heat loss for Temp. Diff. of degrees				





The author takes his testing equipment (old, but reliable, he boasts) to an installation and puts the system through his suggested 10-step check procedure. Draft gauge and CO_2 analyser are housed in the box.

Installing and Adjusting Oil-Fired Heating Equipment

By E. F. Fuller

E. F. Fuller Engineering Co., Nashotah, Wisc.

THOSE of us who have stayed with the oil burner, well remember the trouble we had adjusting the old manually operated natural draft, gravity oil feed burners back in 1922.

A constant ratio of air to oil was just impossible in those days, the burners smoked and had to be cleaned every week to ten days during the heating season.

Over a period of years, great improvement has been accomplished in the oil burner industry; the forced draft, high pressure atomizing, gun type oil burner which now accounts for 80 per cent of burner sales in fully automatic; highly efficient adjustments can be made, and almost perfect combustion can be accomplished in heating plants which have been correctly designed for firing with oil.

In purchasing an oil burner, the wise buyer, seeks first, an oil burner dealer who knows his burner and understands correct installation, as the best burner in the world will not operate satisfactorily, unless it is properly installed and scientifically adjusted. The science of oil burner installing cannot be learned in books alone, or by installing one or two burners, but is acquired only by years of study and practical experience.

The following is essential to correct installation:

1. Study and become familiar with Underwriters Regulations, state and local laws governing installation and permits for electric wiring, fuel oil tanks, and oil burner installations.

2. Make a detailed heating survey and calculate the maximum heat loss of the building. As a basis of calculation use American Society Heating & Ventilating Engineers Guide for heat loss coefficients of transmission for materials entering into the construction of the building, and United States Weather Bureau reports for coldest weather of locality in which the building is constructed.

3. To convert solid fuel burning plants to oil firing, the rated capacity of the heating plant must be calculated as follows. Example:

100 M.K.L. = 100,000 Btu. (Maximum heat loss of building).
K = 1000 Btu.
25 Add 25% for heat loss in transmission.
31 Add 25% for intermittent firing of oil burner.

156 M.K.L. should be the rated capacity of heating plant.

Many oil burner failures have been caused by estimating that an intermittent firing oil burner will heat as well as coal in a solid fuel burning plant. Such a plant must have at least 31% excess capacity over coal to be adequate for oil heat.

4. Consult authorized sources for rated capacity of heating plants.

a. Net Load Recommendations for Heating
a. Boilers—Heating Piping and Air Conditioning Contractors Association.
b. Home Owners Catalogue.
c. A.S.H.&V.E. GUIDE.
d. Authorized University Tests.
e. Commercial catalogue ratings are for the most part reliable, but certain manufacturers still refuse to submit their heating equipment for authorized tests.

5. Select correct size and spray angle for fuel nozzle. To deliver 100,000 Btu. per hour into a building with the average conversion burner, figure 2 on, 1 off, or a total of 40 minutes burner operation per hour in the coldest weather at 60% efficiency which would call for a 1.6 gals. per hour spray nozzle.

efficiency of steam plants. Neither of the above test systems give us an accurate measure of the conduction and distribution of heat into the building.

Comparative Heating with Oil, Gas, or Coal, by J. George Kohl, based on a study of the actual consumption figures, and the Degree-Day Hand Book, are valuable contributions to fuel consumption calculations.

With the advent of new, much more highly efficient heating plants, some of the old averages are being rapidly upset and a new system is being devised for heat loss calculations, that will be flexible, simple, accurate, and can be used by the average salesman of oil burners, stokers, coal pulverizers, and all oil, gas, coal, or electric heating equipment.

10. After installation is completed, do not forget the burner until you have a service call, but make periodical inspections, study the burner operation, keep record of fuel consumed, and number of degree days for each heating season.

In specializing for the past fifteen years on oil heating equipment, the writer has pioneered the

Do These Things in This Order

1—Know your local regulations.
2—Make an accurate heat loss calculation.
3—Be sure cool furnaces have extra capacity.
4—Check the rated capacity of the heater.
5—Select the correct oil burner nozzle.
6—Build a proper combustion chamber.
7—Plan for all noise elimination.
8—Have electrician install proper wiring.
9—Adjust the burner for maximum efficiency.
10—Plan a periodical inspection.

For boiler-burner, or furnace-burner units, figure 80% efficiency, which would require a 1.35 nozzle. Angle spread to be selected to throw the flame as near the walls of combustion chamber as possible, but flame must not touch or impinge on floor, sides, end, or on any point of combustion chamber.

6. Combustion chamber to be built of material 3100 P.C.E. Pyrometric cone equivalent.

Size of chamber to have 1 square foot floor area per gallon capacity of fuel spray nozzle.

1.6 nozzle = 14 × 16-inch floor space, not less than 16 inches high.

7. Eliminate unnecessary noises. Noises not to exceed 10 decibels. To prevent mechanical noises, use proper insulation. To eliminate combustion roar, adjust for proper ratio of air to oil, consistent with construction of the heating plant.

8. Install and test electrical equipment for positive operation, and avoid overload on circuit. Burner and controls should be wired on separate circuit.

9. Adjust burner, establish correct ratio of air to oil, make combustion tests, and estimate annual consumption of fuel oil.

Over a period of years, tests conducted on the basis of flue gas temperature, draft, and CO_2 have been satisfactory, and sufficiently accurate to greatly improve the adjustment of the average oil burner. Evaporative tests to establish the ratio of pounds of oil input to pounds steam generated, are the most accurate tests for combustion

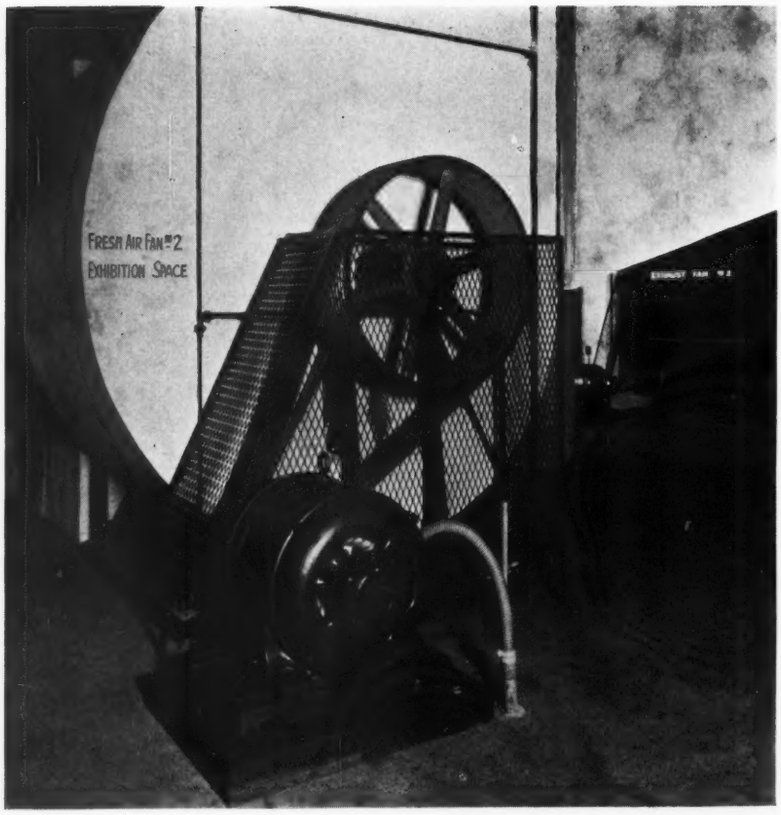
sale of a number of highly efficient oil heating products, which have not been universally backed by fuel oil dealers.

The advent of the stoker in the coal industry has made it necessary for the oil industry to produce cheaper heat, but some oil dealers still seem to think it is better business to back a heating plant that will consume double the amount of oil necessary to heat the same building. Test sheets are available to prove that certain oil burning plants will produce an equal amount of heat with one-half the amount of oil as others now offered for sale to the consumer public.

Each salesman, of course, would like us to believe the equipment he is selling, is the most efficient and the best of its kind offered for sale by any heating contractor. The proof is simple. At a number of meetings of the Oil Heating Association of Wisconsin, the writer has advocated a showdown test for each system sold by members of the association. The suggestion has not become popular to date.

Improvement is being made in the guidance of the consumer public, by various accredited agencies, which will soon demand credentials from any and all vendors of heating equipment.

In case the average oil burner dealer does not care to purchase, and cannot find time to learn to correctly use instruments required for accurate oil burner tests and adjustments, it is recommended a competent engineer be retained and that the consumer be shown where it is a saving in dollars and cents to pay extra for this service in all oil burner installations.



40-10 H. P. Century motor for two speed fan operation

Small Motors for Air Conditioning

By C. H. Lankford
Century Electric Company

THE motor manufacturing industry agrees that efficiency is too often permitted to overshadow reliability and general mechanical stability; i.e. good mechanical design and construction.

For a fair example of this we might take a motor having a full load current consumption of 300 watts. To increase the efficiency of that motor by 5 points would decrease the current consumption by about 15 watts. A 5 point increase in efficiency on the average small motor of today would be out of the question.

A 15 watt reduction in a load operating, say 20 hours per day, would mean a total power consumption of less than ½ kilowatt hour. With current selling today in the neighborhood of 2 to 5 cents per Kilowatt hour the added cost would run from 1 to 2½ cents per day. It is from this that we arrive at the conclusion that high efficiency is permitted to unduly overshadow other more important things.

The efficiency of capacitor single phase motors is equal to or slightly better than for single phase repulsion start induction run motors.

Polyphase motor efficiency ranges from slightly higher to 3 or 4 points higher than single phase motors.

The contractor, the service man, and the user should be less concerned over the efficiency and more interested in well balanced starting and running characteristics and good mechanical design. That will include reasonably low starting current, freedom from light flicker, a good bearing design, adequate lubrication, good balance, and reasonably quiet operation.

Bearings and Lubrication

It is generally conceded that the additional noise of ball bearings is a handicap. Sleeve bearing construction covers a fairly wide territory from the softer white metal lining on through yellow brass and red brass up through the several grades of phosphor bronze.

Each has its advantages and disadvantages. The softer metals when insufficiently lubricated will not freeze and lock the rotor like the harder bearing surfaces, but if the difficulty is aggravated there is always the possibility that the bearing will burn and melt away completely allowing the rotor to come down and strike the field.

Proper overload protection in a case of this kind would save the motor, but so frequently overload protection is partially or entirely inadequate.

Brass is good but the cost approaches bronze,

therefore, the phosphor bronze with its better lasting qualities is preferred. So, excepting in very small motors the tendency is to go to phosphor bronze.

Lubrication was once considered to be a weekly "chore". Later, with improved bearing housing construction which provided for conservation of the lubricants, the time was stretched out 30 days, then again to 90 days, 6 months until today the average small motor is not lubricated much more than once every 12 months.

In sizes up to one or possibly one and one-half horsepower the wool yarn system of lubrication is now used by many manufacturers and is safe and dependable. It has the advantage of conserving the lubricant. The oil is held in suspension by capillary attraction almost indefinitely. It is fed to the bearings while the motor is in operation in sufficient quantities to provide adequate lubrication although not in large volumes like a ring oiler would provide.

Above this size where bearing pressures are higher and bearing duty generally more severe a greater volume of lubricant must be passed through the bearing to prevent metal-to-metal contact between the journal and the bearing and this calls for ring oilers. However, in these sizes greater oil well capacity is available and the loss of a few drops of lubricant is not so vital as contrasted to the smaller types where the permissible space which may be reserved for oil well capacity is relatively small.

Then too, improvements in bearing housing construction have practically eliminated the possibilities of any considerable volume of the oil being siphoned out or drawn out by the cooling fans of the rotor.

As a final summation of bearings and lubrication, the selection should be based upon the preferable type of bearing metal; the method of conducting lubricants to the bearing. A safe rule is one horsepower and smaller—wool yarn lubrication and larger sizes—oil ring lubrication.

A word of caution in the case of wool yarn lubricated motors; make sure that the yarn used for packing the oil well is nothing but high grade long fibre yarn. Experience has shown that cheaper grades of yarn—waste nitro cellulose fibres and similar media will not fully answer the purpose.

Probable Motor Life

The length of time that a motor may be expected to stay on the job and provide satisfactory service is to a large extent an academic problem; a problem based on probabilities. Basically, a motor properly applied and supplied with current of the proper voltage and frequency with reasonable attention, cleanliness and lubrication should last almost indefinitely. Conversely, a motor that is overloaded or subjected to low voltage or lacks attention might pass out of the picture on a moments notice.

When the critical moment arrives, the actual determination of how long the motor is going to remain in operating condition when difficulties are removed depends almost directly upon its current-taking capacity. The heating in the winding of a motor varies directly as the square of the current in amperes. From this it is apparent that a motor taking 10 amperes under a locked rotor condition would produce four times as much heat as a winding taking five amperes under the same conditions.

The locked rotor amperes of single phase capacitor motors will average about one-third to one-half higher than for corresponding single phase, repulsion start induction run motors.

Locked rotor amperes per line for three phase squirrel cage induction motors are from 5% to 7% less than repulsion start induction run motors. Therefore, the locked rotor current is a relative measure of the ability of the motor to stand abuse under locked rotor conditions the most adverse conditions which may be encountered. This remark is made disregarding the possibilities of overload protective devices protecting the motor.

Failure of Insulation

Failure from heat will occur when the insulation disintegrates. This applies irrespective of whether the heat required for disintegration is all accumulated by the application of a fairly high temperature in a comparatively short space of time or whether from a less severe temperature over a relatively long period.

Class A insulation as used in all general purpose motors consists of cotton, felt, paper, and similar materials treated or impregnated in such a manner as to increase the thermal limit and conductor insulation including bare enamel wire covered with silk or cotton.

The question then that becomes one of concern is where does Class A insulating material begin to deteriorate? The standardization rules of the American Institute of Electrical Engineers permits a maximum hot spot temperature of 105° C., but authorities differ on whether or not this is entirely safe. An authority which has stood the test of time—a paper under the combined authorship of Steinmetz and Lamme published in April, 1913 makes this statement: "In class A the materials appear to have a very long life (or almost indefinitely long life beside the mechanical limitations) if subjected to ultimate temperatures which never exceed 90° C. Also they appear to have a comparatively long life even at ultimate temperatures as high as 100° C."

All in all, the Steinmetz-Lamme paper is a warning not to venture above 100° C., even in the hottest spot. Without venturing too far upon a controversial subject we may say that the repeated starting and stopping, especially for those motors taking the higher starting current, will in time produce some deterioration. There is no recovery so deterioration is cumulative—a little today, a little tomorrow and on and on until the motor finally fails. We cannot refute the fact that potential failure is higher in the case of the motor taking the higher starting current which may start deterioration by rather long drawn out starting periods due to overloads, low voltage, excessive friction loads

or anything not originally contemplated by the manufacturer of the equipment on which they apply the motor.

Somewhere between the ideal life under the best of operating conditions and destruction under locked rotor conditions lies a condition which applies to the average motor installation.

A reasonable guess for average life of the higher starting current motors—split phase and capacitor—would be from ten to fifteen years. For the lower current repulsion start induction run motors the average should easily run thirty-five to fifty per cent longer.

This brings us face to face with the next problem which is the relationship of starting current to wiring requirements.

Relationship of Starting Current to Wiring Requirements

Here is another problem which deals with a large number of variable factors, but which after all is based definitely on Ohm's law. With a certain value of starting current in amperes, a certain predetermined voltage at the motor terminal and a known distance from the point of distribution, the size of wire is mathematically fixed.

Obviously, a motor of the same horsepower rating and voltage having a starting current of double the value drawn by another similar motor would require double the cross section of copper to deliver current at the motor terminals at equivalent voltages.

The service capacity (transformers, lines, meters, etc.) required for capacitor motors to produce the same locked rotor torque as a corresponding repulsion start induction run motor will be 75% to 90% greater. That is, the capacitor motor may require almost double the wire size for equal torque, equal line drop and the same degree of lighting disturbance.

Now and then someone becomes worried over the question of power factor but here again the user, the dealer, and others concerned must depend upon the product of a reputable manufacturer having as high a power factor as is consistent with a well balanced motor design. There are variations to be sure, but often times the variations from one make to another is no greater than the commercial variation from one motor to another of the same make. Here, as in the case of efficiency, a few points variation in power factor is insignificant as compared to the large variation in locked rotor current from one type of motor to another. Some motors take no more than 3 or 3½ times full load current and others take 5, 6, or 7 times full load current.

Control Devices and Overload Protection

The self contained compressor unit invariably used now for residential air conditioning will be supplied complete with all control devices necessary for the successful operation of the equipment.

These controls have been selected by the designers of the equipment in collaboration with the motor designers and control designers, so giving the unit the best possible combination of control for the purpose intended. The average installation man will do well not to try to improve upon either the equipment or the results to be secured from its use.

Control equipment should perform three distinct functions as follows:

1. To establish the current.
2. To provide the proper sequence of operation for the results desired.
3. To provide overload protection in all cases possible.

Presupposing all home installations to be fully automatic there will be no necessity for discussing manual control.

Thermostatic regulators, humidity regulators, float switches, and other pilot devices provide two wire control. This, coupled with the motor control itself, gives some degree of low voltage protection.

A three position transfer switch is oftentimes used in connection with this method of control and so provides the possibility of switching from the automatic to manual control for testing purposes or for readily removing the equipment from service during vacation periods or other times when the premises are not occupied.

(Warning—Three wire control devices cannot be used in combination with two wire devices.)

Summary

A brief summation of what has been said can be expressed in the recommendation that of the heating, ventilating, or air conditioning contractor or service man, relying on his own initiative where a motor selection must be made, should observe the following:

1. Select a motor of adequate power.
2. Do not over-estimate the importance of power factor, efficiency, or any over-emphasized characteristic which precludes the manufacturer's building a well balanced design.
3. Avoid a motor which would produce overly heavy starting current and corresponding light flicker.
4. Where more than one type is available select the type most commonly used.
5. Quiet operation is essential but does not always take first place.
6. Patronize only those manufacturers who have a long reputation behind them and an organization prepared to give service when and where it is needed.
7. Select only "long hour service characteristic" motors.

[This concludes Mr. Lankford's series. The author will be pleased to answer questions]

Characteristics of Air Borne Particles

By John W. Kurtz

Head, Department of Engineering
Municipal University of Omaha

This article and two articles to follow, are taken from a thesis of the author—"The Relative Efficiency of Air Conditioning Filters." This article presents characteristics of common air borne particles; following articles discuss types of filters and cleaning characteristics and methods for securing better filtering results.

THE nuisance created by the solid particles in the air is dependent on the size, and physical characteristics of the individual particles. The difficulty of catching dust and cinder particles is principally a function of the size and specific gravity of the particles.

The various classifications and characteristics of dust particles in the air are fairly well known. Since these classifications are so varied, and no two authorities agree, the investigator decided to select dusts having different diameters and different characteristics in order to bring out the peculiar differences in filtering efficiencies of the various media.

Lycopodium (fern spores), (Fig. 14) is commonly used by testing laboratories because it is harmless and cheap. It shows up clearly under the microscope, being a rather large somewhat spherical particle which all filters should stop.

Lycopodium is slippery like a flax seed, having a shape like a three cornered pillow. It is constantly surrounded with a film of air and refuses to be wetted, in fact vaseline was found to be the only material to which it would adhere. It possessed a magnetic affinity for glass and rubber when agitated, this characteristic proved to be a serious handicap, as it clogged up the tubes of the apparatus. Heavy charges were used and forced from the mixing jar with a bellows.

Giant ragweed pollen (Fig. 15), is spherical with numerous spurs on its surface. The respiratory organs of the head are irritated by this pollen and when breathed in sufficient quantities one may become sensitized to its presence and the result is

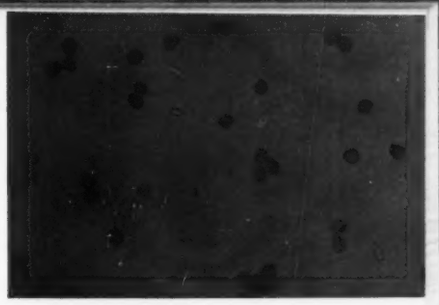


Fig. 14
Lycopodium Fern Spores (30 Microns)

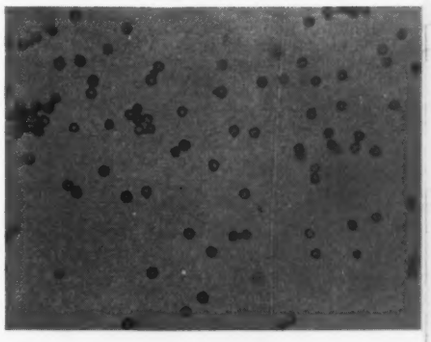


Fig. 15
Giant Ragweed Pollen (2 Microns)



Fig. 16
Puffball Spores (8 Microns)

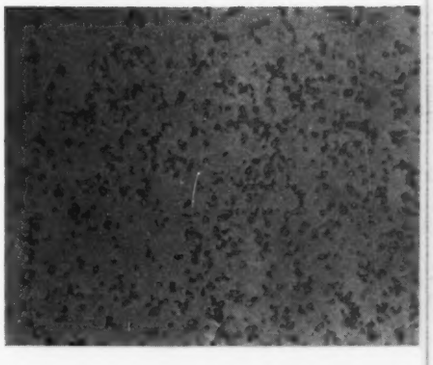


Fig. 17
Abrasive Dust Al_2O_3 (17 Microns)



Fig. 18
Bread Mold—Conidia (15 Microns)



Fig. 19
Citrus Mold (10 Microns)

hay fever. It is a common air-borne pollen in the fall of the year and is classified under pollens causing hay fever. It is readily removed from the air stream by filters having a very fine screening media. It is so light that the filters which rely on breaking up the air stream and retard the momentum of the dust particles are not very effective.

Puffball spores (Fig. 16), act more like smoke than any of the other dusts used. They are so small that they are difficult to count under the microscope with less than 100 diam. magnification.

The filters removed puffball spores as readily as ragweed pollen in spite of the difference in diameters. The puffball spores were always mixed with the mycellium which are thread like in structure and entrap the puffball spores. This linty mass is easily caught and held by all the filters, thus showing a high relative efficiency for the filters.

Puffball spores have a tendency to stick to everything they touch. They were found to be highly hygroscopic, so much so that when the relative humidity exceeded 70% it was impossible to raise them from the mixing jar.

Abrasive Dusts

Abrasive dust Al_2O_3 (Fig. 17), was selected as a typical irritating dust found in manufacturing and industrial plants. Two other varieties of the same dust were tried but one was too large and the other too small. These dusts are commonly used for polishing glass. The dust particles were irregular in shape with sharp edges. It was impossible to count this dust on a light field, but they showed up like small gold nuggets on a dark field. They were the only dust particles tested which would refract light, even so, it was necessary to use a number ten eyepiece and increase the magnification to one hundred diameters in order to find all of them.

Bread mold (Fig. 18), (conidia), is the common type of black mold found air-borne everywhere. The pure positive and negative asexual spores were used instead of the sexual spores, called rhyzopus nigricans, which are much larger and hard to dislodge. These spores are regarded as harmless, but several authorities warned against breathing these spores as they would grow and produce cultures in the respiratory organs.[2] The usual result with bread and other foods or even dust is the formation of an abundant growth of mold.[3] This growth is accentuated with moisture and increased temperatures.[4] This dust is also hygroscopic.[5]

Citrus mold spores (Fig. 19), act much like bread mold spores, they are small and light and are difficult to screen or impinge. They are highly hygroscopic and had a tendency to stick to everything.

This mold commonly forms on fruits and vegetables and is frequently called green mold. Canning plants, store houses for fruits and vegetables are continually fighting this type of mold. It is air-borne, and found everywhere. Its growth is accelerated with moisture and temperature.

Practically all of the filters tested proved to have the lowest relative efficiency in the removal of citrus mold from the air stream.

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[2]"Control of bacteria and mold spores." *American Air Filters in Industry,* (1934).
[3]*University of Minnesota Agriculture Experiment Station,* "Some new facts about molds and bread." (March, 1934), 296.
[4]"Survey of bread mold." *American Society of Bakery Engineers,* LXXIV (April, 1932), LXXXIII (November, 1932), and XCI (November, 1933).
[5]Victor E. Marx, and others, "Mold and rope." *American Society of Bakery Engineers,* LXXV (May, 1932).

Porcelain Enamel Sheet Exterior

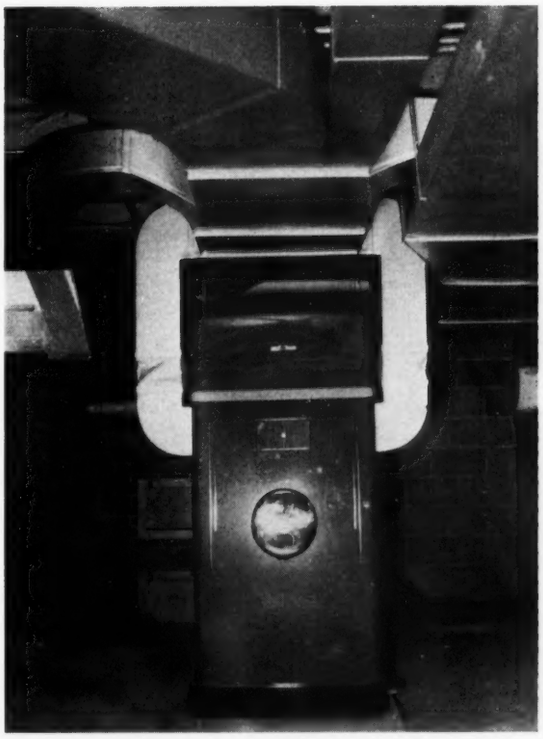
BELIEVED to be the world's largest installation of architectural porcelain enamel, the new 5-story J. W. Knapp department store building at Lansing, Michigan, has approximately 18,000 square feet of porcelain enameled Macotta, fused on Armco enameling iron. Macotta is said to be the only load-bearing masonry unit with a facing of porcelain enamel.



The color scheme is dark cream with dark blue bands for the field; light cream with dark blue bands, in the top floor; light blue and dark blue for the show window base. There are windows only in the pylons above the doors and on the fifth floor. Reinforced concrete pillars which support the building are located at the rear of the windows so that the walls of glass along each floor are continuous. Exterior walls are of cantilever construction.

The porcelain enamel units are set on a mortar board and joined in a manner similar to limestone or other masonry units. Stone setters need neither special tools nor previous experience.

Bowd-Munson Company of Lansing were the architects, and H. G. Christman-Lansing Company, also of Lansing, the general contractors. The Davidson Enameling Company, of Clyde, Ohio, supplied the porcelain enameled iron.



Installing Duct Systems 60 Miles From Home

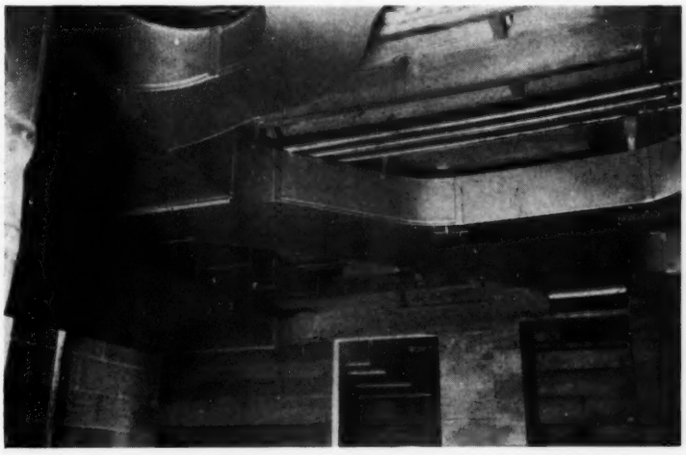
THIS is a story of the method used to take measurements, fabricate and erect residential duct systems, by a contractor whose jobs frequently are 60 miles or more from the shop.

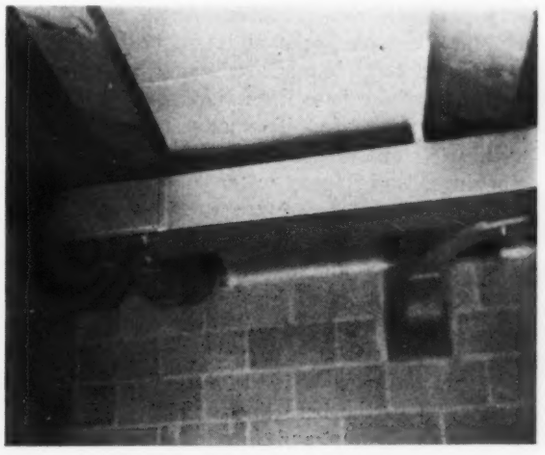
These systems are installed for agencies which sell the heating equipment, but do no sheet metal work. The original sheet metal cost estimates used by the equipment agency are based upon a per-opening basis, but the cost per opening varies directly with the distance the job is from the sheet metal shop. Incidentally, this cost per opening estimate has been worked out from detailed studies of several hundred jobs and is not a guess or even an estimate, but is the actual average cost for the same sized job the same trucking distance from the shop.

The contractor operating on this basis is the Skillman Sheet Metal Works of Omaha, Nebraska. The shop is operated by a father and a son, Lee Skillman, the father, for many years was foreman for one of the largest sheet metal shops in the middle west—specializing in ventilation—and the work turned out and construction methods employed reflect this early training. Gene Skillman, the son, does most of the outside work and has been largely responsible for developing the method to be described.

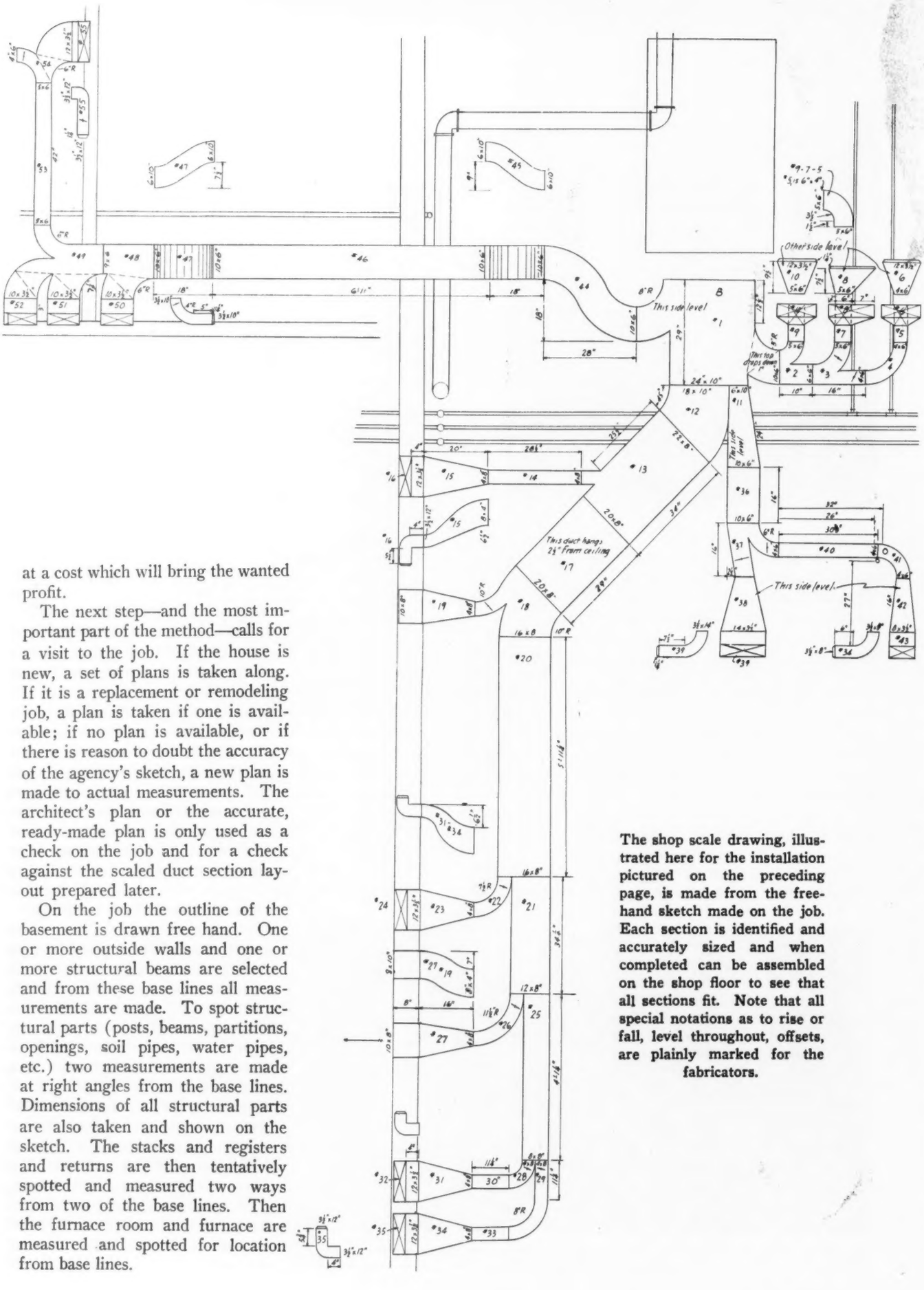
To take the method through the usual routine, we can assume that the installaion shown in the photographs has been sold by the equipment agency. A plan for heating the house is prepared by the equipment agency salesman, local engineer or perhaps a distant factory engineering department. The house owner is probably shown a single line drawing of the proposed system with the explanation that final arrangement of registers, returns and ducts will be made after the plans and construction are farther along.

The equipment agency then brings these plans to Skillman, if the house is local, or mails in the plans if the house is out of town. Whatever explanations are necessary accompany the plans. Any preferences for location of equipment, or registers, or pipes, are listed. And the metal work has been priced to the home owner on the basis of so many openings. With this price-per-opening set purposely high as a result of expensive experience, it is then up to the Skillman shop to install the job





The three photographs on this page show a system designed according to the method described in this article. The ducts shown were fabricated from the scaled drawing on the next page.



at a cost which will bring the wanted profit.

The next step—and the most important part of the method—calls for a visit to the job. If the house is new, a set of plans is taken along. If it is a replacement or remodeling job, a plan is taken if one is available; if no plan is available, or if there is reason to doubt the accuracy of the agency's sketch, a new plan is made to actual measurements. The architect's plan or the accurate, ready-made plan is only used as a check on the job and for a check against the scaled duct section layout prepared later.

On the job the outline of the basement is drawn free hand. One or more outside walls and one or more structural beams are selected and from these base lines all measurements are made. To spot structural parts (posts, beams, partitions, openings, soil pipes, water pipes, etc.) two measurements are made at right angles from the base lines. Dimensions of all structural parts are also taken and shown on the sketch. The stacks and registers and returns are then tentatively spotted and measured two ways from two of the base lines. Then the furnace room and furnace are measured and spotted for location from base lines.

The shop scale drawing, illustrated here for the installation pictured on the preceding page, is made from the free-hand sketch made on the job. Each section is identified and accurately sized and when completed can be assembled on the shop floor to see that all sections fit. Note that all special notations as to rise or fall, level throughout, offsets, are plainly marked for the fabricators.

With these points located the rough plan of connecting pipe work becomes evident. The next problem is to get the pipes from the furnace to the stacks or registers. On the rough sketch, every precaution is taken to see that every offset, every drop or rise in the pipe is accounted for. Where the branch turns up to the register box or stack boot, the rise and radius of the elbow is shown on the sketch. If the main runs across joists to a branch between joists the rise is shown where the turn up is made. If the duct changes section both dimensions are shown. Changes in ceiling heighth or unfinished or finished ceilings are noted where the pipes cross the space. On the runs of pipe the dimensions of each section are indicated and double checked by taking overall measurements from base line or equipment to the change in direction or elevation. And last, special instructions such as cuts through walls, or things which must not be done are itemized on the sketch.

The Shop Scaled Drawing

Checked and rechecked for measurements and possible installation problems, Gene Skillman is then ready to go back to the shop and make up the piping system. In the shop the rough sketch is used to locate on a scaled plan (either architect's or specially prepared) the location of equipment, registers, returns, and structural parts. Registers are then connected up by single line to the furnace; returns are connected up similarly to the blower. Then from the data sheet the sizes of the branches and mains are entered along the single line layout. At this stage several rough pipe layouts may be made to get a system having the fewest resistance building fittings; to clear certain rooms of pipes; to keep as much of the duct work as possible out of sight and out of the way. Then, when the runs of pipe are finally determined, the plan is ready for conversion into actual duct dimensions section by section.

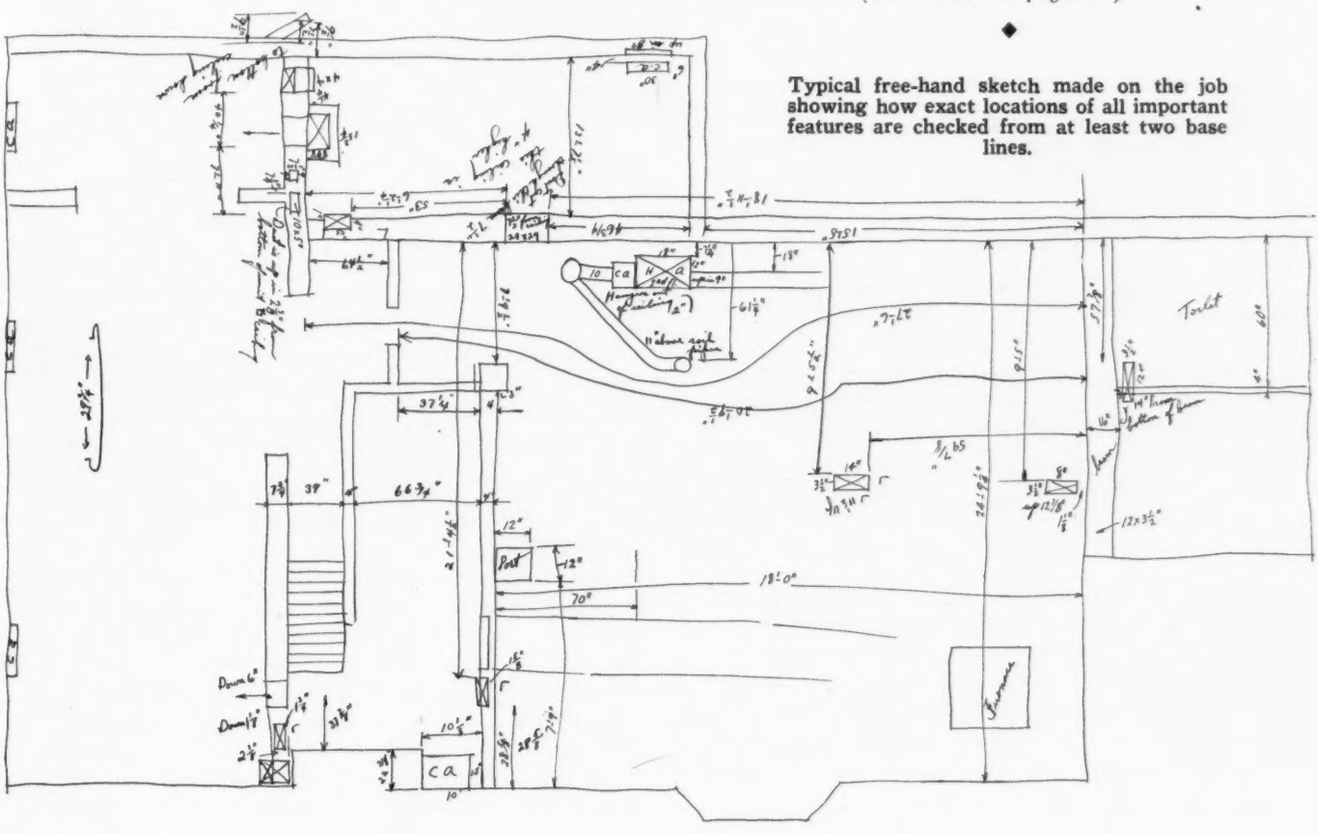
The complete duct layout is prepared to scale—perhaps 1½ inches to the foot or up 3 inches to the foot depending on the size of the installation. On this scaled pipe plan every section is indicated with actual dimensions and every turn, elbow, change in section, change in direction, is laid out just as it will go into the completed pipe work. While these sections are being laid out, all special notes such as whether tops or bottoms are to run level; how far the pipe hangs from the finished ceiling; where the pipe drops down or rises; are included in the proper place on the drawing. And, due to the fact that experience has shown that transitions from horizontal pipe to risers or boots are prime sources of question, each such elbow is usually shown in elevation as well as in plan. Important, also, is the care taken to show the dimensions of all offsets in the pipe so there can be no question of just how many inches the pipe moves over in the offset. And, further to prevent confusion, end dimensions of each section are shown.

The completed result is a plan similar to the one shown.

From this plan the shop fabricates the entire pipe system section by section and numbers assigned to each section (see plan) on the layout are stenciled on each pipe section as it is finished. If necessary the complete system can be assembled

(*Continued on page 64*)

◆



Typical free-hand sketch made on the job showing how exact locations of all important features are checked from at least two base lines.

Pattern Development for

Air Conditioning Fittings*

By William Neubecker
Head Instructor
Sheet Metal Department, New York Trade School

45° Transition, With Off Center Round Opening

A CORRESPONDENT from Elk City, Okla., requests, "the pattern for a transition piece at a 45 degree angle, with the round opening off center of base." The problem is shown in Fig. M in the accompanying illustration. The rectangular opening is to be 36x54 inches, the round opening 36 inches in diameter set off 12 inches from the inner side of the rectangle as shown, with a level base as indicated from *D* to *5*. The transition is to have an angle of 54 degrees when viewed in plan.

Using Reduced Scale Drawing

When laying out work of this size, the patterns can be laid out by means of a reduced drawing or scaling down to 3 inches to the foot. Whichever method is employed the procedure in developing the pattern is as follows. First draw the front elevation as shown. *A-B-C-D* indicates the size of the rectangle 36x54 inches; the diameter of the round pipe is 36 inches and the projection between the round and rectangular ducts is 12 inches all as shown. In this case the transition is to be level on the bottom line *D-5*.

Below the elevation draw any horizontal line as *A-D, E*. At pleasure, establish the projection of the transition when viewed in plan as shown by *E-3*. From the corners *D* and *C* in front elevation, drop vertical lines to the plan intersecting the line *A-D, E* at *A-D* and *B-C*. From *B-C* at an angle of 45 degrees draw a line to intersect the vertical line drawn from point *3* in elevation at *3* in plan. As the narrow side of the rectangle is similar in size to the diameter of the round pipe, then will the line *A-D*, (*7* in plan) also be at an angle of 45 degrees. This then completes the plan and elevation.

Now space the circle in elevation in an equal number of divisions (in this case eight), using more divisions in practical work and number the points from 1 to *8*. From points 1-*2* and *3* draw lines to the corner *B;* from *3-4* and *5* to corner *C;* from *5-6* and *7* to *D* and from *7-8* and 1 to *A*. These lines will then represent the bases of triangles (which will be constructed) whose altitudes or heights will be equal to the projection *E-3* in plan.

Now extend the lines *A-D, E* and *7-3* in plan indefinitely to the right, as shown by *A-D, A,* and *7-A°*. Take the length of *A*-1, *A-8* and *A-7* in elevation and set them off on the line *7-A°* as shown by *A°*-1, *A°-8* and *A°-7*. From *A°* erect a vertical line to intersect the line *E-A* at *A*. Draw lines from *A* to 1, *A* to *8* and *A* to *7* which represent the true lengths of similar numbered lines in the front elevation. The dotted line *A-8* in the true lengths indicates similar numbered dotted line in the front elevation.

In a similar manner take the lengths of *D-7, 6* and *5* in elevation and set them off to the right of the plan as shown by *D°-7, 6* and *5*. From *D°* erect the vertical line to meet the upper line at *D*. Draw lines from *D* to *7, 6* and *5,* the true lengths of similar numbered lines in the front elevation. These two sets of diagrams to the right of plan then give the true lengths for the *front* of the transition piece.

Back Transition True Lengths

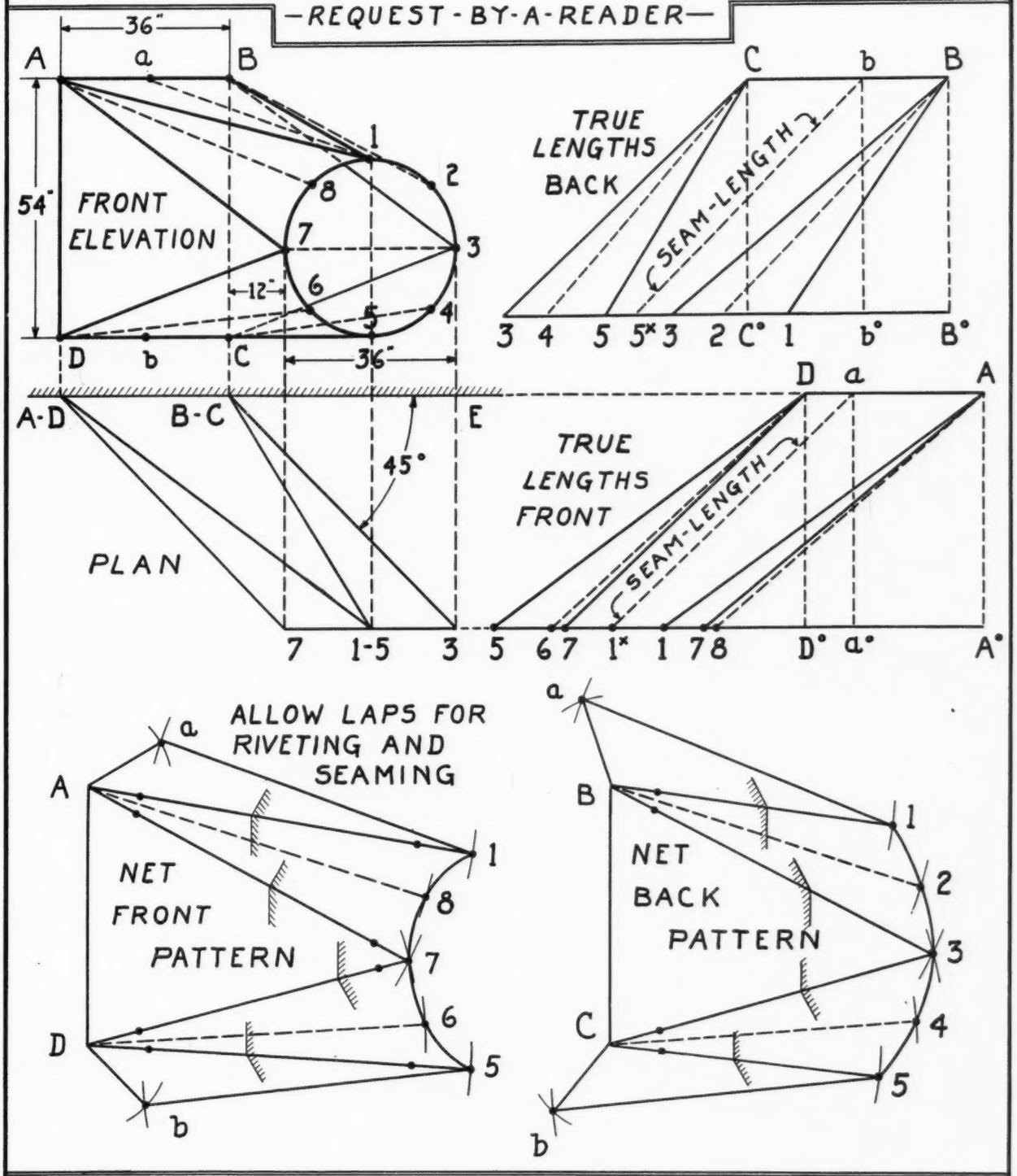
For want of space the true lengths for the *back* of the transition have been laid out to the right of the elevation as follows: Draw any line as *3-B°* and from *B°* erect a line *B°-B* equal to *A°-A* in the front true lengths. From *B* draw a horizontal line to the left indefinitely. Now take the lengths from *B* to 1, *2* and *3* in the front elevation and set them off from *B°* to 1, *2* and *3* and from these points draw the true length lines to *B,* representing the true lengths of similar numbered lines in the front elevation. Again take the distances from *C* to *3, 4* and *5* and set them off from any point as *C°*, as shown from *C°* to *3, 4* and *5*. From *C°* erect the vertical line to intersect the line *B-C* at *C* and from *C* draw lines to *3-4* and *5* representing the true lengths of similar numbered lines in the front elevation.

Assume that a seam will be placed in the center of the ends *A-B* and *C-D* in elevation as shown respectively at *a* and *b*. Draw the seam lines in elevation from *a* to 1 and *b-5*. Find the true lengths of these two seam lines as follows: Take the distance from *a* to 1 and set

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—PATTERN-FOR-DOUBLE-OFFSET-TRANSITION— ——RECTANGULAR-TO-ROUND——

—REQUEST-BY-A-READER—



—FIG.-M-FRONT-ELEVATION-PLAN-TRUE— —LENGTHS-AND-FRONT-AND-BACK-PATTERNS— ——FOR-TRANSITION-PIECE——

it off from $a°$ to 1^x in the front true lengths. From $a°$ erect the vertical line to meet the line *A-D* at *a*. Draw a line from *a* to 1^x the desired true length. In a similar manner take the length from *b* to 5 in front elevation and set it off from $b°$ to 5^x in the back true lengths. From $b°$ erect the vertical line to intersect the line *C-B* at *b*. Draw a line from *b* to 5^x the true length of the seam line *b-5* in the front elevation.

Laying Out the Half Patterns

Having found all of the true lengths for both front and back of the transition, the pattern shape for both halves can now be laid out as shown below the plan as follows: Take the distance of *A-D* in front elevation and set it off as shown by *A-D* in the front pattern below. Now with radius equal to *A-7* in the front true lengths and using *A* in the front pattern as center, draw a short arc near *7* and intersect it by an arc struck from *D* as center with a radius equal to *D-7* in the front true lengths. Draw lines from *A* and *D* to *7*.

Now with radii equal to *A-8* and *A*-1 in the front true lengths and using *A* in the front pattern as center, draw short arcs near *8* and 1. Set the dividers equal to the division *7-8* and *8*-1 in the circle in front elevation and starting from *7* in the front pattern step to arcs *8* and 1 and draw a line from 1 to *A*. Now with *A-a* in the front elevation as radius, and *A* in the front pattern as center, draw a short arc near *a* and intersect it by an arc struck from 1 as center with a radius equal to the seam length 1^x *a* in the front true lengths.

Draw lines in the front pattern from 1 to *a* to *A*. Now with radii equal to *D-6* and *D-5* in the front true lengths and using *D* in the front pattern as center, draw short arcs near *6* and *5*. Again set the dividers between the divisions *7* to *6* to *5* in the circle in front elevation, and starting from *7* in the front pattern step to arcs *6* and *5* and draw a line from *5* to *D*. With radius equal to *D-b* in front elevation and using *D* in front pattern as center, draw a short arc near *b* and intersect it by an arc struck from *5* as center with a radius equal to the seam length 5^x-*b* in the *back* true lengths. Draw lines in the front pattern from *5* to *b* to *D*. Trace the curved line from *5* to *7* to 1, then will *5-7-1-a-A-D-b-5* be the net half pattern for the front of the transition piece.

Back Transition Pattern

The pattern for the back transition is developed in a similar manner. Take the distance of *B-C* in front elevation and set it off as shown by *B-C* in the back pattern below. Now with *B-3* in the back true lengths as radius and using *B* in the back pattern as center draw a short arc near *3* and intersect it by an arc struck from *C* as center with radius equal to *C-3* in the back true lengths. Draw lines from *B* and *C* to *3*. Now with radii equal to *B-2* and *B*-1 in the back true lengths and using *B* in the back pattern as center draw short arcs near *2* and 1. Set the dividers equal to the divisions *3* to *2* to 1 in the circle in front elevation and starting from *3* in the back pattern step to arcs *2* and 1 and draw a line from 1 to *b*.

With a radius equal to *B-a* in the front elevation and with *B* in the back pattern as center, draw a short arc near *a* and intersect it by an arc struck from 1 as center with 1^x-*a* in the *front* true lengths as radius. Draw lines in the back pattern from 1 to *a* to *B*. Now with radii equal to *C-4* and *C-5* in the back true lengths, and using *C* in the back pattern as center draw short arcs near *4* and *5*.

Again set the dividers equal to the divisions *3* to *4* to *5* in the circle in front elevation, and starting from *3* in back pattern, step to arcs *4* and *5* and draw a line from *5* to *C*. Using *C-b* in front elevation as radius and *C* in back pattern as center draw a short arc near *b* and intersect it by an arc struck from *5* as center with the true length of the seam line 5^x-*b* in the back true lengths as radius. Draw lines from *5* to *b* to *C* and trace the curved line from 1 to *3* to *5*. Then will *1-3-5-b-C-B-a*-1 be the net half pattern for the back of the transition piece.

Allow laps on patterns for seaming and riveting. When forming up the pattern shapes make slight bends on the solid lines in patterns always bending *inward* as indicated by the shaded angles.

Precalculated Engineering

(*Continued from page* 51)

$$\frac{21{,}800 - 19{,}400}{19{,}400} \times 100\% = 12 \text{ per cent}$$

greater than indicated by the more precise calculations.

From a practical standpoint it is perfectly reasonable to look at the room air temperature as being directly proportional to the quantity of heat delivered to the room. If we assume that 19,400 Btu. per hour *is* the quantity required to maintain a 70-degree temperature, and if the plant is designed to supply the 21,800 Btu. per hour which the tables call for, the resulting room air temperature will be

$$\frac{21{,}800}{19{,}400} \times 70 \text{ deg.} = 78 \text{ degrees.}$$

Duct Work 60 Miles From Home

(*Continued from page* 61)

for dimension checking on the floor of the shop, or parts of the system can be assembled to check fit of pieces.

If the installation is to be made beyond a reasonable trucking distance, all sections are shipped knocked down; if the job is close by all sections are trucked complete, ready for connection.

The method of handling contract work described has been in use by the Skillman company for several years. Small changes in the general procedure have been made from time to time as experience indicated that certain changes or additions in the way of data would help eliminate questions. As a general summation, both members of the firm believe that only with some similar detailed method can "out of town" or "contract" work be handled profitably.


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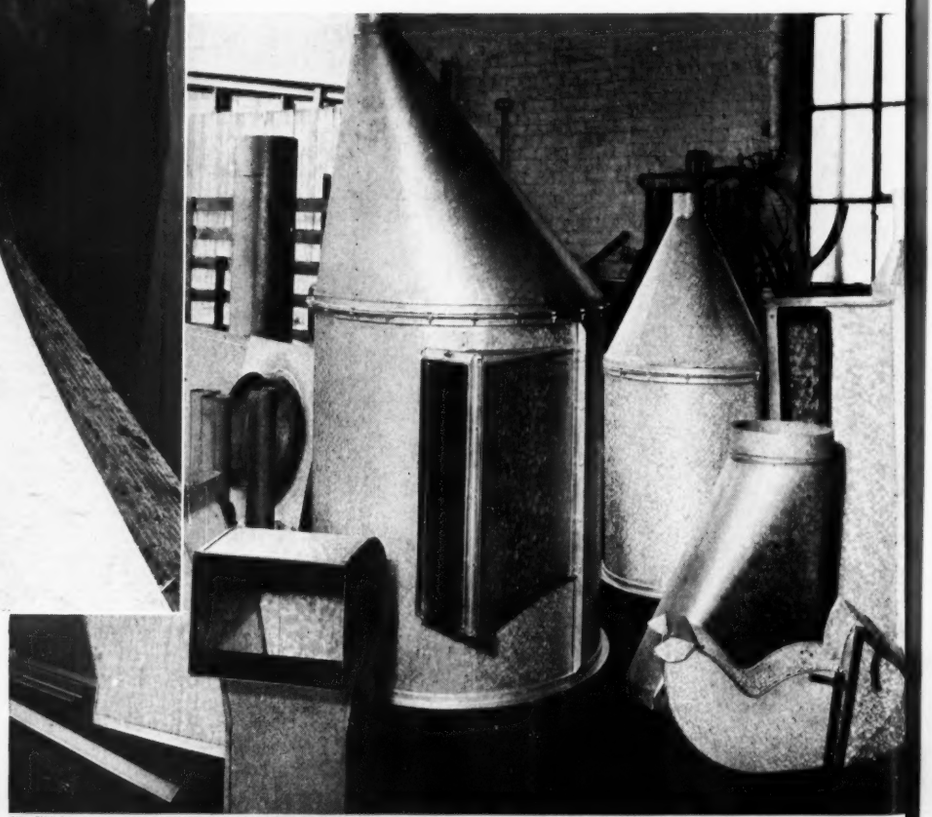
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The longer sheet metal artisans work with Superior Galvanized Sheets the more dependence they place on their quality. This is reflected in their confidence and pride in the finished job, and in their praise for the quality of Superior Sheets.

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The Licensing and Permit Code of Toledo, Ohio

Since interest in heating codes and licensing ordinances is increasing we begin publication here of the Toledo code. This code covers only gravity systems, but has some exceedingly good permit and licensing clauses. We will still take requests for the Ft. Wayne, Ind., code completed last month.

PROVIDING for the licensing of Warm Air Heating Contractors and Shops: the establishment of a Toledo Board of Warm Air Heating; Appointment of Inspectors; and Permit System; and repealing Sections 358 to 364 inclusive of the Code of the City of Toledo, Ohio, and also repealing Section No. 9 of Ordinance No. 2889 of the Code of the City of Toledo, Ohio.

Whereas, it is deemed necessary for the public welfare i. e., to protect against fire hazard created by misinstalled warm air heating systems within the City of Toledo, and the metropolitan area of the City of Toledo, now, therefore,

Be it ordained by the Council of the City of Toledo:

Section 1.

No individual, firm or corporation, shall hereafter establish, maintain or conduct a Warm Air Heating business in the City of Toledo, nor shall anyone engage in the Warm Air Heating business except as officer, representative or employee of a Warm Air Heating establishment duly licensed as provided herein, without first having obtained a license to do business as a Warm Air Heating Contractor from the Commissioner of Inspection of the City of Toledo, and without having qualified by passing an examination satisfactory to the Board of Warm Air Heating.

Section 2. Installation and Location of Furnace

The location of the furnace shall equalize the length of warm air pipes as far as possible, yet give preference to rooms having unusual requirements.

Furnaces installed on wood-joist floors or other combustible construction, shall have protective bases of sheet metal, or asbestos covering, with hollow masonry, not less than four (4) inches in thickness, laid to preserve a free circulation of air in such masonry course. Such bases shall extend at least one foot beyond the furnace on all sides; provided, that extension at the front is at least two (2) feet when solid fuel is used.

The base ring of any warm air furnace shall be cemented to the foundation, and cement flushed in around the back of the base ring, making an air-tight joint.

Warm air furnaces shall be enclosed in metal casings or walls of brick, tile or concrete.

Sheet metal casings including casing tops shall be made of galvanized sheets, not lighter than 26-U. S. Standard Gauge. They shall fit the casing rings closely, so as to be dust tight, and shall be securely fastened to the front. The casing shall be lined from the upper casing ring down to a line on a level with the grate.

Any furnace, the casing top of which shall come to within eighteen (18) inches of a combustible floor, ceiling or joist, shall be protected by a metal shield, extending not less than six (6) inches beyond the casing of said furnace. This shield shall be suspended at least two (2) inches below woodwork, allowing free air space between shield and woodwork. No furnace casing, top, or smokepipe, coming nearer than eight (8) inches of the ceiling or joist to be allowed in any case.

All warm air pipes shall be made of bright tin not lighter than IC, or No. 28 Gauge galvanized iron. Side seams shall be locked seams. All joints shall be either double seamed or lapped not less than one and one-quarter inches (1¼"). Such joints shall be match-beaded, or beaded and soldered, or riveted.

No warm air pipe shall run within one inch (1") of any wood work unless such woodwork is covered with asbestos paper and the paper covered with tin or iron.

All warm air pipes in the basement shall be provided with dampers.

When warm air pipes pass through a masonry wall, a metal thimble shall be provided, having a diameter at least one inch (1") greater than the pipe, and pipe supported in such a manner that the air space is uniform on all sides.

Where warm air pipes pass into unheated space separated from the furnace room they shall be insulated with air cell asbestos paper or the equivalent.

All wall stacks shall be double. There shall be uniform air space of not less than five-sixteenths (5/16) of an inch, which must be maintained between the outer and inner walls of all such pipes and fittings of all kinds, styles and descriptions; such pipes, heads, boots and other fittings to be of the styles, or equal to those accepted by the National Board of Fire Underwriters.

When baseboard and wall registers are used, they shall be properly sealed to the stack head in such a manner as to prevent any leakage of air between the head and the register.

Baseboard, floor or wall registers shall be provided with double register boxes of tin or galvanized iron with an air space of not less than five-sixteenths (5/16) of an inch between inner and outer boxes.

The air supply to the furnace may be taken from outside or from within the building or may be taken partially from outside and partially from within. In no case, however, shall air be supplied to any furnace from any basement or furnace room, not occupied as living quarters.

The cold air intake or return where air is taken from within the building shall have a net area throughout its entire length of not less than the combined net area of all warm air pipes leading from the furnace. This may be maintained in one or more ducts. No reverse incline or air trap will be allowed in any section thereof.

When the cold air supply is taken wholly from the outside of the building the supply duct at its most contracted area must equal or exceed eighty per cent (80%) of the combined area of all warm air pipes leading from the furnace.

Cold air ducts, below joists, shall be constructed of metal, tile or other non-combustible material having smooth inner

surface and shall maintain a constant net area throughout their entire length. All joints shall be made dust tight. Horizontal rectangular return ducts shall have at least 10% greater area than vertical connecting pipes.

Where a boot or shoe is connected to the casing at the base, the opening shall not extend higher than a line on the level of the top of the grate of the furnace. The width of the shoe shall be of proper measurement to make the area at all points at least equal to that of the round or square pipe to which it is connected. This boot or shoe shall be of streamline transition construction.

Wherever the space between joists is used to convey cold air over head, all bridging and bracing may be removed upon the consent of the inspector only. The connection from joist pan to the boot or shoe shall be made of galvanized iron not lighter than No. 26 U. S. Standard Gauge, and shall have a transition fitting, the top area of which shall be at least 10% greater than the area of the connecting pipe.

When it is necessary to set the furnace over a pit and connect cold air under the basement floor, such pit or cold air trench shall be constructed of water-proof concrete or tile and shall not exceed eighteen inches (18") in depth below the casing base ring and the width of the trench or trenches shall be of proper measurement to make the area at least 10% greater than the pipe to which it is connected. The connection between the cold air pipe or duct and the underground pit shall be made with a transition fitting.

The free area of cold air faces shall be at least equal to the free area of the duct or ducts to which they are connected.

The smoke pipe shall be consistent with the location of the furnace. It shall be made of metal not lighter than No. 24 U. S. Standard Gauge, and not less than the full size of the collar on the furnace throughout its entire length. It must have no opening for attaching any fire place, stove, range, water heater, gas or ventilating connection. It shall be lock seamed or riveted; all joints shall lap not less than one and one-half inches (1½") and it shall be rigidly secured. Cast iron smoke pipe may be used. All smoke pipes shall be provided with check dampers, placed on the side of the pipe or at the end of a tee; when cast iron smoke pipe dampers are used they must be placed between the check damper and the furnace and supported on both sides of the pipe.

Where the smoke pipe enters the flue, a thimble shall be cemented into the flue liner and the connection thereto made air tight. Should any smoke pipe come within eighteen inches (18") of any combustible material, such combustible material must be covered with asbestos paper and a metal shield so fastened that a two-inch air space exists between this shield and the combustible material. This shield shall be no less in size than twice the diameter of the smoke pipe and of sufficient length to cover the combustible material at all points.

Whenever furnaces or room heaters are supported by legs not less than five inches (5") high, and set on a combustible floor, the floor under same shall be covered with non-combustible material, extending not less than twelve inches (12") on sides and back of heater and thirty-six inches (36") in front of said heater.

The following provisions shall be made by the owner or building contractor, in any new building wherein a gravity warm air heating system is to be installed.

Provide a chimney for the furnace, constructed in a manner to comply with the following specifications.

Chimneys

The chimney must be absolutely smoke tight throughout its entire length, and shall extend at least three (3) feet above the highest point at which it comes in contact with a roof of the building, and at least two (2) feet higher than any ridge within ten (10) feet of such chimney.

If built of a single thickness of brick or of cement blocks, it shall be lined throughout its entire length with fire clay flue lining, having not less than three-fourths inch (¾") thickness. Flue lining to be laid in mortar and made air tight.

The furnace flue must have no other opening for attaching any fireplace, furnace, stove, range, water heater, gas or ventilating connection. The chimney thimble shall be furnished and installed by owner or building contractor, of the size and in the location specified by the Heating Contractor.

Flue linings shall start at least four (4) inches below the bottom of smoke pipe intake of flue, and shall be continuous the entire heights of the flues. Where recess extends over 4" below smoke pipe intake, clean out must be provided.

If necessary to offset the flue, it must be done in such a manner as not to reduce the cross sectional area or create a ledge or obstruction, where loose material may lodge.

The narrowest dimension shall be not less than eight inches (8") and no flue smaller than 8" x 8" rectangular or eight inch (8") diameter round will be considered suitable when hard coal is to be burned, or 8" x 12" rectangular or ten inch (10") round for soft coal or wood.

Sizes of leader pipe depend entirely upon required air temperature at register entering any given room. Register temperature must be determined before system is designed. 175F at register is approved for designing purposes by National Warm Air Heating and Air Conditioning Association.

The pipe sizes must be of ample capacity to cover heat loss requirements of building or rooms to be heated.

The size of furnace or heating unit, must in all cases, be 25% in excess of heat loss requirement of building to be heated.

Section 3. Power of Director of Public Safety

The Director of Public Safety shall have authority to make administrative rules and regulations to carry out the intentions of this ordinance, as to examination, licenses, permits, inspection; by granting and revoking same the Director may delegate the power to issue permits to the building inspector. A grade of seventy (70%) percent shall be the passing grade for an applicant for a license based on this ordinance and its requirements.

Section 4. Toledo Board of Warm Air Heating; Appointment; Qualifications; Vacancy

The Safety Director with the approval of the City Manager shall appoint a City Board of Warm Air Heating as an advisory board to the Safety Director, consisting of the Commissioner of Inspection and the Chief of the Fire Prevention Bureau, and Three (3) other members who shall be appointed by the Safety Director, citizens of Toledo, actually engaged in the practice and/or business of Warm Air Heating. Vacancies shall be filled by Safety Director with the approval of the City Manager.

Organization of Board; Meetings; Quorum; Rules and Regulations

The City Board of Warm Air Heating shall organize by the election of a chairman and secretary from its members, who shall hold their respective offices for two years and/or until their successors are appointed and qualified.

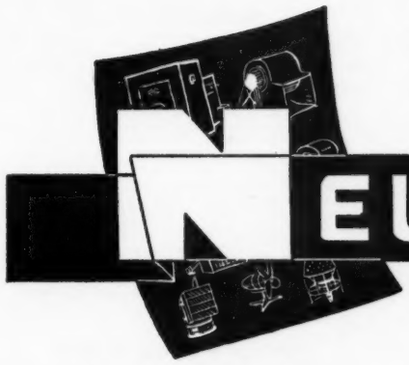
It shall hold regular meetings in the first Saturday of January and July, provided they are not legal holidays, and if so, then on the following Monday, and aditional meetings at such times and places as it shall determine, not to exceed one every two months. A majority of the Board shall constitute a quorum, but a less number may adjourn from time to time.

The Board shall advise rules and regulations governing the practice and business of Warm Air Heating as may be necessary to carry out this ordinance; provided however, that it shall require the concurrence of a majority of the members of the Board to advise granting or to revoking a license.

Record of Proceedings; Proof of Records

The City Board of Warm Air Heating shall keep a record of its proceedings, a register of persons registered as Warm Air Heating Contractors and a register of licenses and certificates revoked.

[To be continued]



For your convenience a number has been assigned each item. Check the items in which you are interested on the coupon on page 102 and mail to us. Complete information will be forwarded.

• Indicates product not listed in 1938 Directory.

△ Indicates product and manufacturer not listed in 1938 Directory.

NEW PRODUCTS

•39—Casing Moulding

The Lau Blower Co., Dayton, Ohio, is offering Lau casing moulding for distinctive styling in furnace, blower and blower-furnace casings.

These casing mouldings enable the

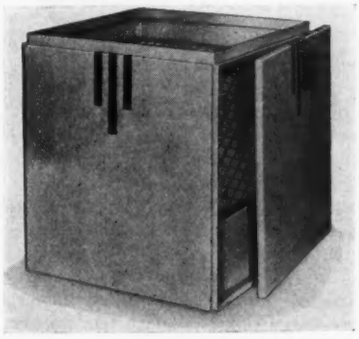


manufacturer to fabricate casings of distinction in his own plant at a fractional cost of the price of ready-made casings. Almost unlimited design possibilities are offered and U-channels to permit quick and easy assembly are also available. A full-size sample is offered with price list and data.

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40—Economy Package

Viking Air Conditioning Corp., Main & Center St., N. W., Cleveland, Ohio, is offering a new Economy Package to meet the requirements of the mass market. The new unit has a capacity

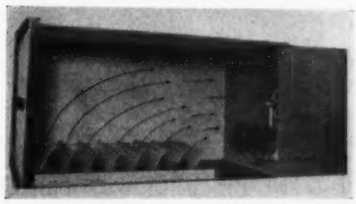


of 1,000 cfm and is suitable for use in conjunction with furnaces up to and including 22 in. The unit can be installed on any warm air system.

The attractively designed steel cabinet is finished in red morocco with black trim.

41—Shut-O-Vent Ventilation

Reed Unit-Fans, Inc., 811 St. Charles St., New Orleans, is distributing a new bulletin on their 1938 ventilating equipment.

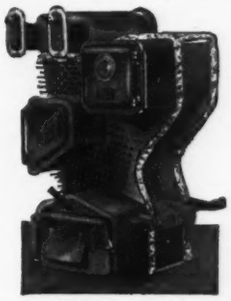


The Shut-O-Vent is an automatic shutter built of substantial gauge galvanized steel, painted. It is closed when the fan is off, forming a positive and insect-proof seal between the house below and the attic above. As soon as the fan is turned on the vanes open and stay open until the fan is turned off.

◆

42—Magazine Feed Furnace

Spencer Heater Division, Lycoming Manufacturing Company, Williamsport, Pennsylvania, is offering a new Spencer automatic feed warm air furnace for gravity or forced air systems.



No. 1 Buckwheat is placed in the storage space, which holds a day's supply. Fire bed, air supply, and combustion space are always the same, the makers say. Attention is required only once or twice in 24 hours. Five to ten minutes daily are sufficient for the man of the house to give all the attention it requires. It is entirely automatic so far as the woman of the house is concerned.

Minneapolis Acratherm and electric damper motor are furnished as optional equipment at additional charge.

Fuel feeds by gravity, automatically and constantly. The design of the Spencer eliminates straight, cylindrical walls.

Advantages listed are: Reduced coal bills, clean and odorless, can not leak gas, and ease with which other air conditioning features are added.

43—Heavy Duty Almar

Ward Machinery Company, 564 W. Washington Boulevard, Chicago, has found it necessary to market a heavy duty corner lock forming machine with a capacity of 16-gauge and lighter, due to the fact that many of the present users of the Almar have requested a larger machine to take care of the heavy class of industrial ventilating which requires 18- and 16-gauge material. In developing the Heavy Duty Almar, all of the features of the Standard Almar have been retained. The Heavy Duty handles 16-gauge as easily as 24-gauge and the speed is the same.

There is a special calibrated gauge so that the machine can be set in-



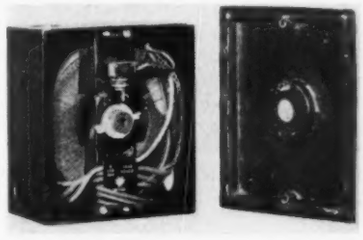
stantly and make the opening in the lock snug to receive the identical material in set lock, that is to say a piece of 24-gauge will fit in a 24-gauge Pittsburgh Lock just as snugly as a piece of 16-gauge will fit in a 16-gauge Pittsburgh Lock.

The machine, powered by a 3-hp motor, shared honors with the Standard Almar at the International Heating and Ventilating Exposition in New York.

◆

44—Variable Speed Motor

General Electric Company, Schenectady, N. Y., featured a new, variable-speed, split-phase capacitor motor at a



display recently, particularly adapted to carrying air-conditioning fan loads.

The control shown is the feature of the motor.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 102.

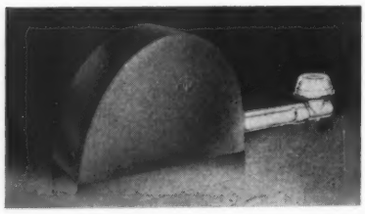
▲45—New Automatic Stokers

Pocahontas Fuel Company Incorporated, Stoker Division, 1190 East 152nd street, Cleveland, announces two automatic stoker models.

Model H. B. "O. P." automatic stoker is a low priced coal burner for residential heating equipment designed to use coking or free burning coals. The streamline hopper with crackled saphire blue finish, has a hopper capacity of 385 lb., 24-inch filling height, chrome nickel retort, built-in air control, and comes complete with all controls, including stoker switch.



Model F. B. "O. P." is a bin-feed automatic stoker for commercial and apartment buildings and is designed for free burning or coking slack coals; has chrome nickel retort, variable pitch



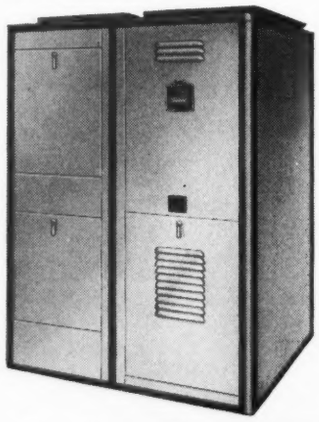
worm which insures correct distribution of coal in fuel bed, high tuyeres for quick draining of clinkers away from retort, and complete controls and standard wind box. The mechanism is attractive and serviceable and does not obstruct the fire door.

◆

●46—Ludlite—A Stainless Steel

Hiland G. Batcheller, president of Ludlum Steel Co., Watervliet, N. Y., announces that Ludlum had started production on a new stainless steel product called Ludlite.

Ludlum Steel Co.'s brand of stainless steel, Silcrome, is well known. Ludlite might be called a "popularization" of Silcrome, taking it out of the "luxury" class and making it available to the average home owner, home builder, store, hotel, institution and manufacturer. A composite product, its surface is a sheet of strong, thin, stainless steel, backed by a tough, nonmetallic material. The backing is waterproof and flexible. By a special process, involving heat and pressure, the Silcrome facing and the backing are permanently joined.



47—Two-Piece Blower Furnace

The Pacific Gas Radiator Company of Los Angeles and Huntington Park, California, has added to its line a new gas-fired air conditioning unit known as Model A-69.

It is a modern and compact forced air basement furnace with built-in blower for delivering clean, healthful air under positive, uniform pressure, in sufficient volume for any problem.

Blower and heating units are made in separate cases and joined together securely and neatly with stripping which gives the appearance of an attractive streamlined one-piece casing. This special feature allows the furnace to be shipped in two units, making it easy to handle and install in basements.

Pacific multi-tubular burners are standard equipment. In this type of burner there are no adjustable air mixers. Each unit is a complete blue-flame bunsen burner drawing its own individual air supply mixed in exact proportion for highest temperature flame possible.

The Pacific Blower furnace, Model A-69, is made in heating capacities from 75,000 to 200,000 Btu. Summer air conditioning equipment may be added if desired.

◆

48—Blowers—Motors—Humidifiers

Russell Electric Company, 340 West Huron street, Chicago, since discontinuing the manufacture and sale of air conditioning units to the trade, is utilizing their wide field experience together with manufacturing and development facilities in building specialties for manufacturers of air conditioning units. They announce a new spiroidal blower with direct connected 8-pole motor and a complete "Jet and Target" humidifier assembly. Two standard motors are available—1/5 hp. 8-pole, vertically operating Ballentine in either capacitor or split phase types. An 8-speed switch with efficient auto-transformer control is also available.

▲49—Tin-It

George B. Klee Company, 635 Rockdale avenue, Cincinnati, Ohio, produces Tin-It, a retinning compound used to refinish all metals with the exception of aluminum and lead.

Tin-It is a prepared concentrated tin, combined with chromium, in powder form, harder than ordinary tin and will not stain or corrode. It is mixed with water and painted on the surface, after which a blow torch is applied and the surface wiped.

◆

50—Low Cost Units

The Dail Steel Products Company of Lansing, Michigan, has developed three new units to meet the need for automatic heating and air conditioning in the low cost housing program. All the automatic features provided in equipment used in more expensive homes are embodied, yet they are available at prices that are within the reach of the four or five thousand dollar home.

They are extremely compact in design, making them especially suited to the single floor, utility room house. They are convertible to either oil or gas and show a very high efficiency with either fuel. These units, complete with oil burner, can be completely installed in the well-insulated five-room home for about the same price that many standard makes of oil burners alone sold for five or six years ago.



The smallest unit, 26x51x60 in. high, is equipped with an assembly of two 9-in. Blue Flame Range burners and one 4½-in. burner, which acts as continuous pilot. This unit develops 60,000 Btu. at the bonnet and 1,000 Cfm. This range burner develops an especially clean blue flame, is automatically controlled and is highly efficient.

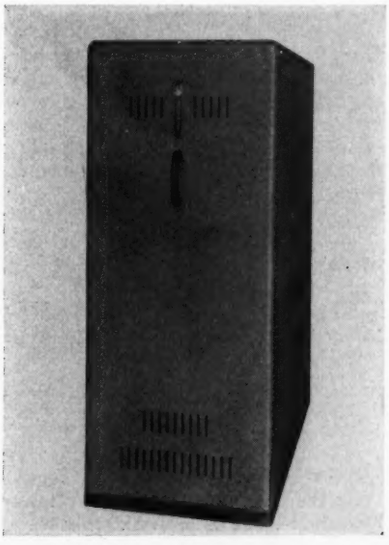
For six-room houses this same furnace is equipped with power burner and pre-cast hearth, or with gas burner, in either case developing 85,000 Btu. at the bonnet and 1,200 Cfm. Dealers can use any standard make burner or burner can be furnished with unit. The furnace is equipped with top blower, preheating baffles, filters and humidifier.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 102.

•51—The Capitolaire

United States Radiator Corporation, 1056 National Bank Building, Detroit, Michigan, announces the Capitolaire—a furnace unit oil burnered by Breeze—complete from room thermostat to automatic humidifier, assembled in one crated unit, ready for chimney connection.



This compact furnace will deliver 100,000 BTUs at register with low oil consumption. The over-all dimensions are 24 inches wide, by 57 high by 52 deep. Jacket colors to harmonize with modern basements are offered.

Each unit comes completely assembled and is shipped in one crate and has been under fire and electrically tested before shipment is made.

◆

▲52—Blower Housings

Detroit Stamping Company, Detroit, Michigan, announces new standard dimension "Blow Aire" blower housings for air conditioning and heat circulating wheels, made in five different



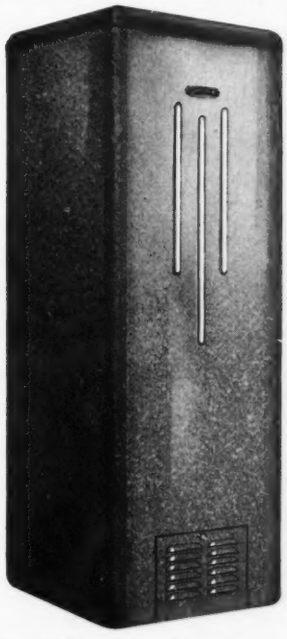
diameters to fit the standard 4½, 5, 6, 7½ and 9-inch diameter wheels, also in all widths to suit either single or double inlet wheels. They are adaptable to room air conditioning units, kitchen ventilating or individual room duct ventilating, and other applications where a wheel, housing and motor are used to create a forced draft.

The Blow Aire inlet flange and cover plate are interchangeable on either side of the housing for either direction of wheel. Removable baffle of cut-out in housing outlet permits the use of housing without it, in installations where practically no resistance to air flow exists and a slightly greater air volume is desired.

◆

•53—Automatic Water Heater

Lochinvar Corporation, 14247 Tireman avenue, Dearborn, Michigan, announces a redesigned automatic oil burning water heater thermostatically controlled with a Multiple-Stage



burner. When there is no demand for hot water, the unit runs on a very low pilot.

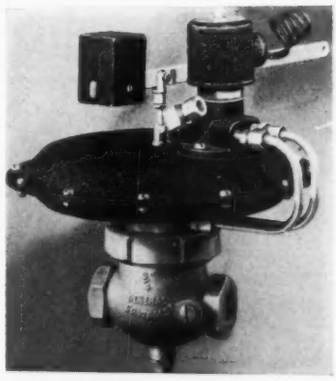
The Lochinvar water heater has a square casing finished in ripple green enamel and trimmed with chromium plated strips, to match the Model 100A oil-burning furnace.

◆

54—Clock Thermostat

Perfex Controls Company, 415 W. Oklahoma Place, Milwaukee, Wisconsin, has just added to its line a clock thermostat—a twin thermostat which controls both day and night temperatures to be mounted where it will provide proper temperature regulation, and an attractive clock which may be mounted where it will be most useful and appropriate.

Independent day and night temperature settings on the thermostat provide flexibility of temperature control.



55—New Gas Valve

General Controls Co., 450 East Ohio Street, Chicago, announces a new electrically operated gas valve, said to provide ideal ignition conditions. The valve is two-wire, current failure, and does not require oiling or servicing. This new "B-55-1" is a compact model for domestic applications. Its overall dimensions now make possible mounting within a modern conversion burner, domestic furnace or boiler casing.

The valve controls the gas flow and damper opening simultaneously. Gas is bled into the furnace only during opening period to give a flare pilot effect to ignite main flow of gas. The damper is set to open slightly ahead of gas flow.

The damper arm operation is separate from the main valve stem. The main valve will close even though the damper arm may be held up by an external object.

Opening speed is adjustable—an important feature where variable conditions of ignition, combustion and gas pressure exist. Fast shut-off is fixed. Union nut construction allows swinging damper arm into any position in a few seconds time.

Listed as standard by Underwriters' and Associated Factory Mutual.

◆

56—Forced Air Heater

The Bryant Heater Company of Cleveland, announces a new, low cost, forced air heater, designed to heat small homes, offices, and stores.

To be known as the BA-88, the heater will be available in three sizes ranging from an A.G.A. Btu. input per hour rating of 85,000 on the small unit, 100,000 on the middle size and 125,000 on the largest.

Heating sections are provided with cast iron combustion chamber and flue gas collectors. The heat transfer tubes on the small model are chromium steel alloy and on the two larger sizes, finned cast iron construction. The tubes are streamlined to afford a maximum scrubbing action and staggered to insure a close rubbing contact. A centrifugal blower type fan provides large volume air delivery against the normal range of duct resistances.

The unit can be used as a complete winter air conditioner by adding low cost filters and an automatic humidifier. The jacket finish is Bryant blue crackle.

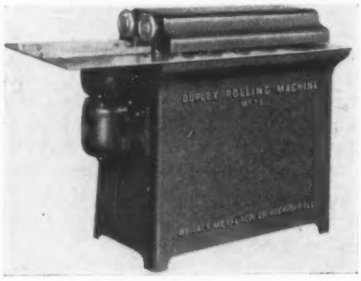
New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 102.

•57—Rolling Machine

The Whitney Metal Tool Co., Rockford, Illinois, has recently introduced the No. 75 Duplex rolling machine.

There is a double set of rolls—one set to be used for forming corner locks and the other for drive cleats, or some similar folded form. Either or both



sets of rolls may be used at the same time. Various sets of rolls will be furnished as the user requires.

The machine will handle material up to 18 ga. and feeds the sheet through the rolls at the high speed of 38 fpm.

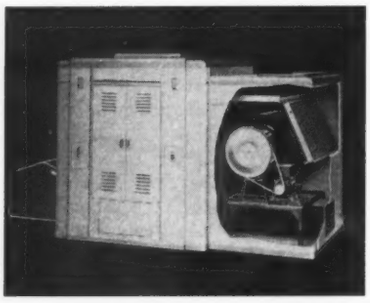
The extension feed table has adjustable guide bars which can be set to control the amount of overhang as desired when running corner locks.

◆

58—Sunbeam Air Conditioner

The Sunbeam Series "S" air conditioner manufactured by The Fox Furnace Company, Elyria, Ohio, and designed for stoker firing exclusively, has received the approval of Anthracite Industries, Inc., whose laboratory has tested the unit and certified its rating of 150,000 Btu. capacity at register on Model 24-S and 200,000 Btu. on Model 27-S.

This new Sunbeam unit is designed for hopper and bin feed stokers. A



special model is available for installation of stoker below floor level.

One of the features of the Series "S" is its large double radiator which will accommodate an unusually large accumulation of fly ash without reducing the rated heating capacity of the unit.

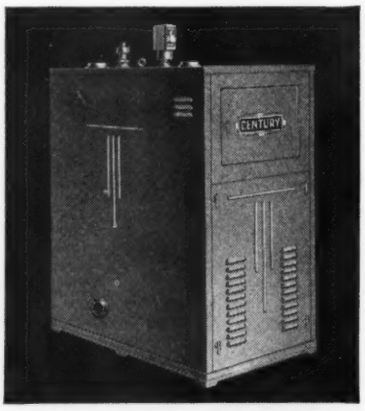
The Series "S" is designed for both bituminous and anthracite coal and is said to be equally suitable and efficient with both.

A convenient feature is the clinker compartment located between the front casting and fire pot. As clinkers are removed from fire bed they are dropped into a Clinker Pan located in this compartment, to be removed and emptied after clinkers have cooled and odorous gases have passed out the flue.

◆

•59—Boiler Burner Unit

Century Engineering Corporation, Cedar Rapids, Iowa, is announcing a new boiler burner unit, featuring the patented Century principle of heating the water from both the inside and outside of the boiler shell. The extremely large heating surface per gallon of water, they say signifies low stack temperature and high efficiency. Combustion takes place primarily inside the shell at the bottom, passes upward through the center passageway, spreads out in all directions on top of



the shell, then downward completely around the shell to the bottom, then directed toward the bottom rear where the stack connection is located.

The boiler proper is enclosed in a double insulated casing which directs the gases over the outer shell surface after primary combustion has taken place inside the unit.

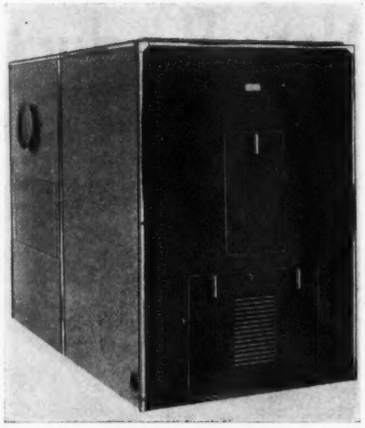
The outer casing is made of automotive sheets, cabinet type, either enclosed or exposed burner compartment types. The entire unit is completely assembled into a portable unit at the factory and shipped on skids.

Century's new Model K burner with the floating flame principle, designed especially for this new boiler-burner unit is in two sizes—500 and 1,000 sq. ft. steam capacity.

◆

•60—Small Home Furnace

The Duo-Therm Division of Motor Wheel Corporation, Lansing, Michigan, announces a new line of oil-fired air conditioned heating units specifically designed for the smaller home.



Heading the list of special features is Duo-Therm's patented Dual Chamber burner. Other features include modern tailored cabinets; powerful blowers and triple filters; built-in draft regulators; special waste stopper located in the cold air return; double casings; automatic humidifiers; three-way stack outlets; and insulation against noise.

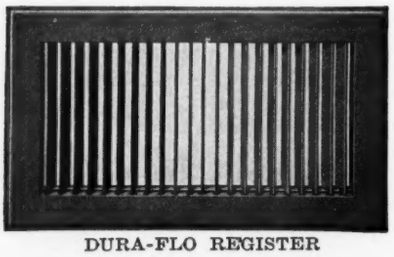
There are three models included in the line with Btu. outputs ranging from 51,500 to 112,000. All models are listed as standard by the Underwriter's Laboratories.

◆

61—New Registers

Auer Register Company, Cleveland, just brought out two new registers.

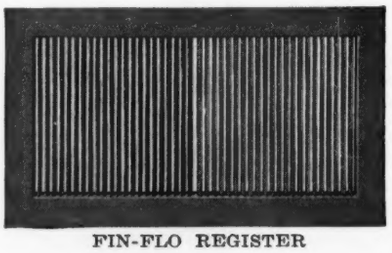
One of these is the Dura-Flo and has a straight bar face, with fixed bars set either for one direction or multi-directional. It is a wall register for



DURA-FLO REGISTER

air conditioning or gravity heating systems. Frame is substantially built and all bars are fastened to frame with mortised and blocked fit.

The second register is the Auer Fin-Flo, of fin type design with thin blades



FIN-FLO REGISTER

set (at the factory) for any desired directional flow. This model is particularly intended for modern forced air systems of heating or cooling. Fin blades are securely fastened to frame through mortises, right-angle bend.

Both these registers show a high percentage of free air opening.

New Products . . . . . .

For your convenience in obtaining information regarding these items, use the coupon on page 102.

62—Stack Control Switch

Gleason-Avery, Inc., of Auburn, N. Y., manufacturers of thermostats, damper control motors, limit switches, relays time switches, stoker controls and other regulators, have introduced a new precision-built stack-control switch which may be wired for safety installation in direct or reverse action. It may be wired for high-limit control



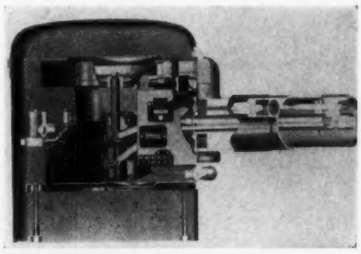
on stoker, blower or damper motors, or may be connected for either rising or falling temperatures to regulate heating output. The same switch is adaptable to either high or low voltage on any two or three-wire circuit. The dealer need stock only one switch for both uses.

◆

63—G. E. Oil Burner

General Electric Co. is now in production at Bloomfield, N. J., on their improved type of oil burner for use with warm air furnace or boiler, after ten years of laboratory study and testing in the field.

In appearance and in the method of oil atomization the new burner departs



from conventional types. It also features a "tailored flame," which can be adjusted simply on the side of the burner tube to conform to most types of combustion chambers, resulting in low installation costs and high efficiency in combustion.

The gray metal jacket of the burner, like those of the G-E oil furnaces, was designed by Ray Patten, well-known stylist. The jacket encloses all parts and wiring, and will be a distinct contribution to any basement.

Burner and controls are assembled as a unit.

64—Blower-Filter Unit

Enterprise Boiler & Tank Works, Inc., 1955 N. Long Ave., Chicago, is marketing a new type of blower-filter unit—the "Pure Air."

The new spiroidal wheel with hyperbolic spiral blade has an air delivery of from 2800 cfm at ⅛-in. to 750 cfm at ½-in., controlled to any size job by the special air throttle damper on the single speed unit and by the speed variation on the 8-speed unit.

The cabinet is 25 x 30 x 27 in., with a 30-in. wide boot connection to furnace.

◆

65—New Moncrief

The Henry Furnace & Foundry Company announces a new addition to its line of air conditioners. The new unit is the Series "EE" of which the heating element is the Moncrief Series "E"



steel furnace. This unit adapts itself to burning both coal and oil with equal facility.

The purpose of this new item of the Moncrief line is to place in the hands of dealers an air conditioner with steel heating unit which they can sell at a price to enlist the attention of the man of moderate means.

The heating unit and the blower and filter are enclosed in separate cabinets. The blower-filter cabinet may be aligned either alongside or at the rear of the heater cabinet. The exterior is finished in crackle green.

◆

▲ 66—Patterns

G. L. Gray Sheet Metal Works, 507 Grand Avenue, New Haven, Connecticut, has had so many requests for 45-degree branch patterns that they have gotten out two complete sets known as sets No. 3 and 4.

Set No. 3 is for 2 to 12 in. branches on 2 to 30 inch diameter. Set No. 4 is for 12 to 24 inch branches on 12 to 48 in. diameter. 324 patterns.

Other patterns have been revised and the patterns 2 to 20-inch diameter have been added to be included with set No. 1 elbow patterns.



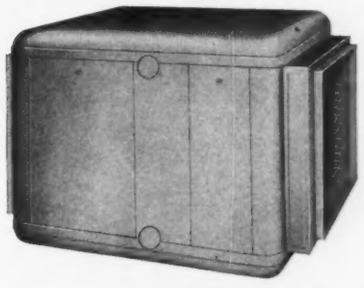
67—Crescent Snips

Crescent Tool Company, Jamestown, N. Y., manufacture snips in four different styles and in a complete range of sizes. The illustration shows the 12-inch size of the regular straight cutting style U412 in use on a recent air conditioning unit installation.

◆

68—Humidifying Conditioner

The Trane Company, La Crosse, Wisconsin, announces the new Trane humidifying conditioner, designed especially for winter comfort. It is quiet, efficient, compact, small, light-weight, and easy to install. The Trane humidifying conditioner transforms a radiator system into a winter air conditioning system at low cost.



The new humidifying conditioner has a capacity of 300 cfm. of air.

The Trane humidifying conditioner is simply connected to the existing heating system (steam or hot water) and to a water supply line and waste line. One supply and one return duct are usually enough.

The Trane humidifying conditioner comes in an attractive steel cabinet coated with gunmetal enamel.

◆

69—New Spot Welder

Eisler Engineering Co., 740-770 South 13th Street, Newark, New Jersey, announces the new Eisler spot welder and welder tips catalogue 38W entitled "Electric Spot and But Welding Machine" recently issued. The catalogue contains 100 pages and has over 1,250 illustrations on various welding problems.



"It is only natural for men who are constantly beleaguered by salesmen to adopt a mask of sales resistance. Some of us pretend to be Tough Guys. Others pose as Funny Guys. And today a slew of us, admittedly grasping at an excuse to defer decisions, have adopted the downcast attitude of the Sad Guy.

"But all of us have one thing in common . . . we hang up our masks of sales resistance when we pick up AMERICAN ARTISAN. We pay subscription cash for it because it brings us money-making ideas suggested by editors who know warm air heating, air conditioning and sheet metal contracting inside and out.

"We read the advertisements, too, because we know that any advertiser in AMERICAN ARTISAN is addressing his message to us because he has something real to offer . . . not because he gets editorial 'puffs'. Those advertisers' salesmen stand the best chance of getting back of our protective masks when they call!"

Kruckman's Washington Letter

(*Continued from page* 42)

well over $100,000,000 for March, not including loans guaranteed for apartment houses or, as termed by the FHA, multifamily group housing projects. Loans of this type are expected to run over $100,000,000 more for March. It will interest the industry to know that under the new Housing amendments the large group housing enterprises may be equipped with air-conditioning systems. Plans for projects that have been approved have not yet been completed, but it is known that air-conditioning will be included.

Basing their expectations on present applications, FHA people estimate that considerably over one billion, possibly approaching two billions, will have been loaned under the new insurance guarantee by the end of this calendar year. The applications at this time exceed all past records.

TVA's Dr. Morgan

It may interest sheet metal men to learn that Dr. Arthur E. Morgan, star of the TVA Congressional inquiry, is very competent in the trade. Dr. Morgan, one of the greatest hydraulic engineers of our time, has always believed that handicraft and craftsmanship are fundamental requisites of the cultural equipment of every man. He learned to do sheet metal work when he was a youngster wandering over the country.

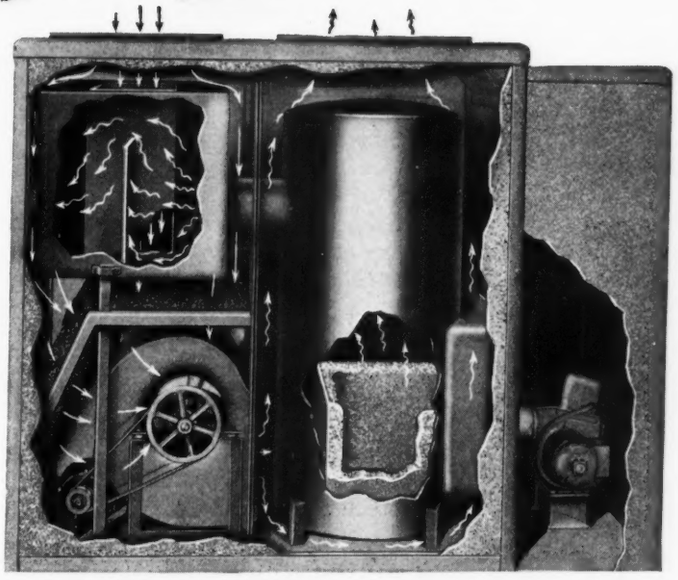
He is a self-taught engineer, just as he is a self-taught educator. As the head of Antioch College in Yellow Springs, Ohio, Dr. Morgan, who prefers to be called Mr. Morgan, made it a basic article of faith that the students should learn to work with their hands as well as with their heads. To this end they were sent out to fill jobs for stated periods, and then returned to the college for their academic work. Dr. Morgan tried to put his theories at work in the Tennessee Valley. His emphasis on handicraft aroused much opposition. In common with young people elsewhere, the youth of the Tennessee Valley hankered for white collar jobs. Dr. Morgan is a very extraordinary person. He is fanatically honest, absolutely incorruptible, will not compromise, exceptionally intelligent, and yet is as shrewd and realistic as a good engineer and a working mathematician must be. Dr. Morgan's fight for purity in the TVA appears extreme, but may lead to eventualities in our political situation that are not dreamed of.

1938 Recovery

Despite surface indications to the contrary, Washington believes there is a fair chance that recovery may be immediately possible. Many reasons for the feeling may be cited. One of the major apprehensions contrariwise, is founded upon the outcome of the present fight for government reorganization. The intimate feeling in Congress is that reorganization is necessary. But at the same time it is felt that this is not a propitious time for such a momentous undertaking. The reasoning runs something like this: The various novel adventures of the past five years have been essentially right, but most of them have been too precipitate. There have been too many of them; they have cost too much, and they have involved too much risky financing. The result has been uncertainty, insecurity, reluctance, and finally paralysis in business.

IT MUST BE GOOD!

• • • • WHEN LEADING FURNACE MANUFACTURERS IMITATE the CHEVIRON Gas or Oil FURNACE



● Of course we feel proud when we design a furnace that incorporates new principles of construction, and then have leading furnace manufacturers imitate it. It is truly a compliment, and it is the best proof we know of that the CHEVIRON is the best engineered furnace on the market. Why not compare the CHEVIRON with other furnaces —then write us for details.

CHEVIRON AMERICA'S FINEST FURNACES

MICHIGAN TANK & FURNACE CORP. 14101 PRAIRIE AVE. DETROIT, MICHIGAN

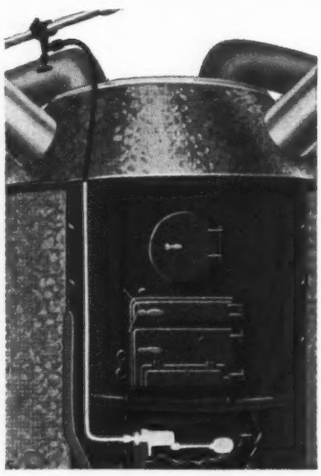


A COMPLETE HUMIDIFYING SYSTEM *IN ONE PACKAGE*

● **M-VB "packaged Humidification" means more profits for you. The M-VB Humidifier Valve can be easily fitted to any warm-air furnace. By keeping the water pan full to the right level always, it protects homes from unhealthy, over-dry air.**

The package illustrated contains the valve and all necessary tubing and fittings. You can install it in less than an hour.

The advantages of the M-VB Humidifier Valve will sell it to your customers who have warm-air furnaces. Tell them about it. Write for free descriptive booklet.



M-VB Morency-Van Buren Division
SCOVILL MANUFACTURING CO.
STURGIS MICHIGAN

Complete Stocks also maintained at Waterville, Conn., and San Francisco, Calif.

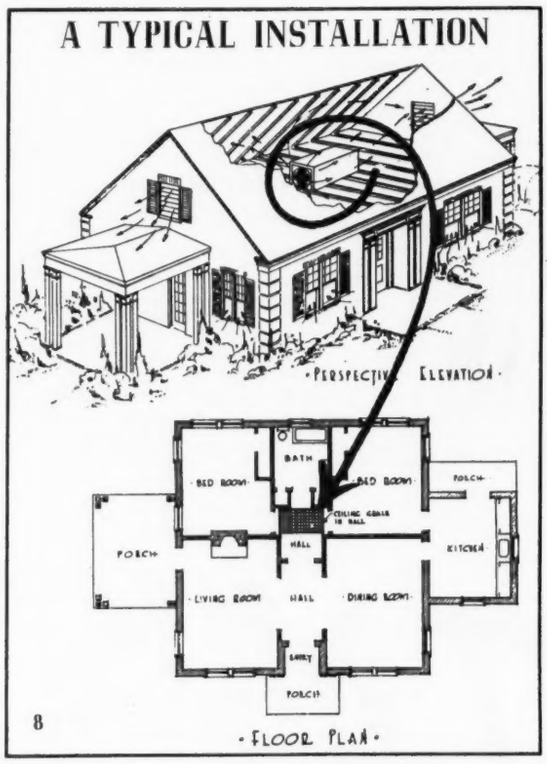
A COMPLETE LINE OF CLOSET TANK FITTINGS

Attic Ventilation In Southwest Cities

(*Continued from page* 47)

utility would, however, make free surveys for any home owner and serve as a clearing house and all leads would be rotated among cooperating contractors excepting where the owner had a preference for some make of fan or some particular dealer.

In June the utility announced a prize contest for a better name for the method. "Attic Ventilation" was not considered satisfactory. Prizes were $100,



Further to picture the installation in the prospect's home, one typical plan was shown like this for a one-story house. Where there are no attic windows, eave louvres are used.

$50, $25; names to be three words or less and must be accompanied by a letter telling why the name was suggested. The awards were made in July; the name chosen being "Air Flow Cooling." More than 700 names were submitted.

At the close of the 1937 campaign 58 dealers were cooperating in the campaign.

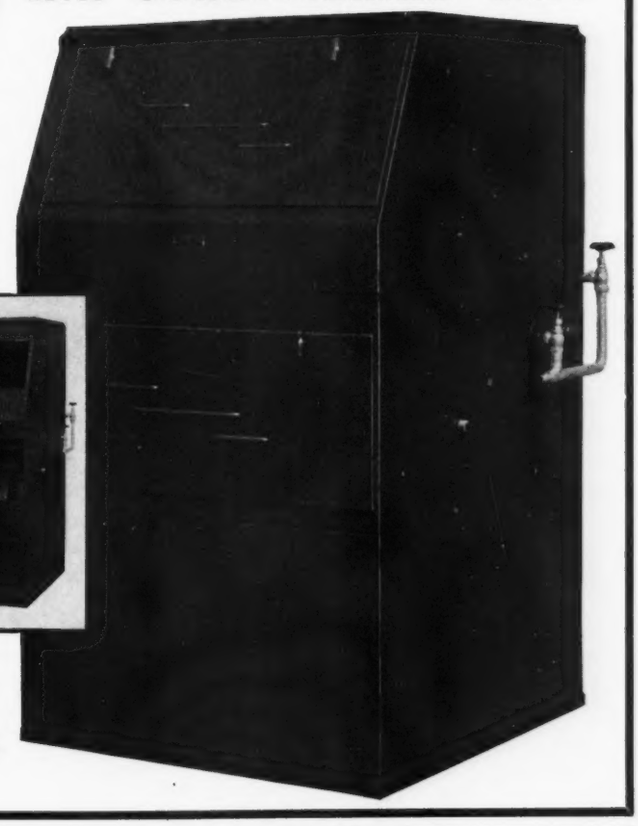
The results of the 1937 campaign plotted month by month are as follows:

Month	Number of dealers reporting	Number of units sold	Estimated amount of sales, $
1936	..	124	24,800
March	1	1	100
April	9	15	1,300
May	6	23	2,300
June	18	86	8,600
July	28	86	8,600
August	30	65	6,500
September	5	32	3,200

[To be continued]

GOLDEN ROD

Complete Water-Type AIR CONDITIONING UNIT



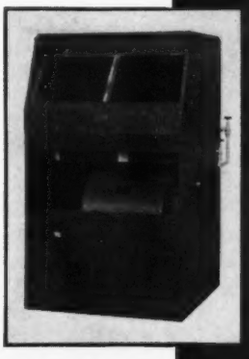
VERY LOW PRICE

The reason GOLDEN ROD dealers are so unusually successful is that this great COMPLETE Air-Conditioning System is (1) Low Priced, (2) Economical to Operate, (3) Wonderfully Efficient! Water from city mains or well is the cooling element. Complete with the famous Golden-Rod "Quiet-ized" Blower, cooling coils and filters. Rated at 3 tons, using 6 gpm 60° water and 2,200 cfm 85% return air. Suitable for 8 or 10-room homes, stores or office buildings. For summer and winter use.

Package Type Blower



This is one of several Golden-Rod blowers, featured by unusual silence, efficient blower wheel, durability, maximum air delivery, ease of installation and better accessibility. Large filter area. Capacities, 1,000 to 4,000 CFM.



See Your Jobber or Write!

Go to your nearest distributor at once and get complete information about Golden-Rod Conditioners and Blowers. Or, write for complete details, and name of nearest distributor.

F. JADEN MANUFACTURING CO., INC.
Hastings, Nebraska

Design Forced Air Jobs Quickly and Accurately With the Aid of This New Designing Manual

SECOND EDITION

FORCED AIR HEATING

215 Pages—6"x9"—clothbound—Illustrated—$2.00



Including
109 Illustrations
15 Charts
23 Formulas
19 Tables

Into this enlarged second edition has been put, in simple, readily understandable form, ALL the information the contractor needs to enable him to design any forced air heating system correctly and efficiently. It embodies all of the really worthwhile data on forced air heating that has been made available during the past several years, and shows by clear examples how to apply this knowledge properly in actual design work.

In designing a complete winter air conditioning system for a typical residence step by step, this practical manual outlines a model procedure of design, based on wide experience, which the contractor may follow with confidence on any of his own jobs. It also gives him a new data sheet, the use of which makes it impossible to overlook any factor in figuring the heat load, and shows in complete detail how to fill it in.

Every thought and device to make the new FORCED AIR HEATING a practical, everyday guide to correct procedure in forced air design work has been included in it.

Every contractor who is anxious to avoid mistakes and wasted time in forced air work should own a copy of this book. Send $2.00 today to the address below for your copy. You may order with the privilege of returning the book within ten days for a refund, if for any reason it should prove unsatisfactory.

CHAPTER HEADINGS

1—A Suggested Data Sheet
2—Procedure of Design
3—Sizing the Apparatus
4—Infiltration
5—Registers and Returns
6—Multiple Registers
7—Return Air Systems
8—Selecting Register Temperatures
9—Temperature Drop in Ducts
10—Mechanical Code for Forced Air Heating
11—Sizing Ducts by Friction Chart Method
12—Sizing Extra Long Runs
13—Pressure Losses
14—Velocities
15—Proportioning Losses in Heating Systems
16—Branch Take Offs
17—Volume Dampers
18—Bonnets and Plenums
19—Casing Baffling
20—Chimneys and Drafts
21—Air Conditioning Radiator Heated Houses
22—Automatic Control
23—Contract and Specifications
24—The Index

KEENEY PUBLISHING COMPANY 6 North Michigan Avenue Chicago, Illinois

New York State Convention

(*Continued from page* 38)

respect to the construction, installation, alteration, maintenance or repair of air conditioning systems. Local boards in each city of the State are provided for to administer the rules and regulations of the State Board and to issue certificates of competency to contractors. A certificate of competency is issued to contractors who have been qualified by the local board and a Certificate of Inspection and Approval is issued when the system has been inspected, tested and approved by the local Board. The State Board outlined in the bill shall consist of five members appointed by the Governor, one of whom shall be a sheet metal worker of at least ten years experience in the construction, installation, alteration, maintenance or repair of air conditioning systems; one of whom shall be a sheet metal employer of equal experience; one of whom shall be a steamfitter of equal experience; one of whom shall be a steamfitter employer of equal experience; one of whom shall be a mechanical engineer of equal experience.

It was brought out in discussion that the consulting engineers, the American Society of Heating and Ventilating Engineers of New York State, and many other groups are fighting this bill and that there seems no likelihood at present of the bill being passed.

Contractors were treated to a number of interesting programs, such as the talking picture, "Romance of Steel," by the American Rolling Mill Company, "When Winter Comes" by the Johns-Manville Company. Open house was held by the Bethlehem Steel Corporation who took contractors through the new steel rolling mill at Lackawanna, New York. One evening session was devoted to boxing, wrestling and a buffet supper, with the banquet held on the evening of March 9. A very elaborate and unusually good floor show was presented as part of the banquet.

◆

Anthracite Conference

Dr. C. C. Williams, President of Lehigh University, announces the first Anthracite Conference to be held under the University auspices on April 29 and 30.

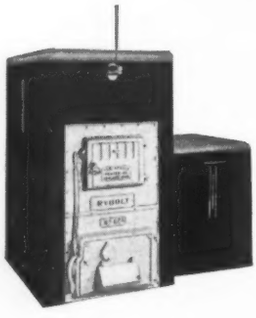
The purpose of this conference, which is expected to become an annual affair, is to survey recent engineering developments in the mining and utilization of Anthracite and to bring engineers, educators, members of the industry and the general public up to date on the rapid technological progress in Pennsylvania's hard coal industry.

Conference Chairman, Dr. Herman Eckfeldt, Professor of Mining Engineering at Lehigh, has arranged for eighteen technical papers to be presented at the conference. These will focus interest and consideration of engineers, educators, and the industry's selling forces on the rapid engineering progress being made in production, distribution, automatic burning and consumer economy of Anthracite. Additional reports of the utilization of ash, and the non-fuel uses of Anthracite will also be included in the two-day discussion.

Papers will be presented by outstanding authorities on the various subjects covered, and at the conclusion of the conference the eighteen papers will be published in a single report which will be made available for general reference.

SPRING IS ON ITS WAY!





. . . and coming with it is a lot of repair work for you heating and air conditioning men. Those furnaces in your prospects' homes will have taken quite a beating by spring and you'll find many that need a good going over. . . . In some places you'll find they've given up the ghost entirely. Get into those basements NOW! Show the home owner where the repairs needed will add up to a tidy sum . . . and you'll start him thinking in terms that will mean a profitable installation for you. Start the year right. *Go after those jobs now* . . . and when you get them specify and install Rybolts for big profits. Write *today* for further information.

RYBOLT HEATER COMPANY, Ashland, Ohio

Ask the AEROFIN Man



To Help You on Your Cooling or Heating Problems

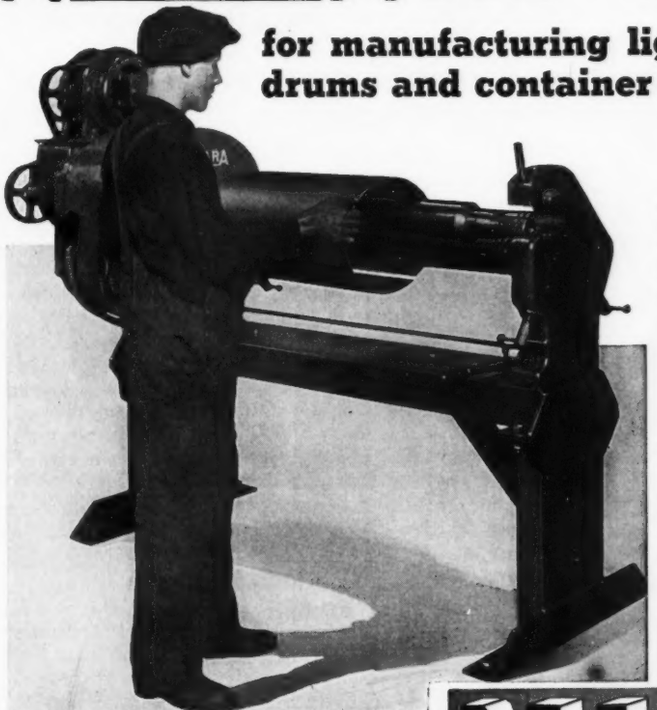
Aerofin Corporation, through its home office and six strategically located branch offices, is prepared to help you on all problems involving the application of Aerofin heat exchange surface or to suggest the most efficient use of this superior surface to a variety of requirements.

The prompt, personal and technical cooperation of our engineers is at your disposal. Write to the home office in Syracuse or consult your local telephone directory for addresses of branch offices listed.

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for manufacturing light and heavy pipe, stacks, drums and container bodies, large tank segments and other products on a production basis.

Their quick, easy adjustment, and convenient rapid operation save time, cut costs and build profits for modern shops. Niagara Slip Roll Formers are built in a complete line of hand and power operated machines for different thicknesses of material and various working lengths. Write for Bulletin 77 giving complete information on this complete line.



There is a complete line of Niagara Machines for the various operations on sheet metal products.



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35 FEET PER MINUTE!

THAT'S THE SPEED OF THE ALMAR CORNER LOCK FORMING MACHINE



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THIS MODEL FOR RESIDENTIAL AIR CONDITIONING DUCTS AND FITTINGS

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1—No fracture in metal, perfect offset
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4—Snug fit to receive flange
5—Adjustable hammer over edge
6—Uniform recess, ample depth
7—Seam perfectly true, tightly closed



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ALMAR USERS IN 36 STATES

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Almar Junior, Standard and Heavy Duty

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MACHINES TOOLS SUPPLIES FOR SHEET METALS EXCLUSIVELY
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CHICAGO ILLINOIS

Association Activities . .

Chicago

The annual banquet of the Master Furnace Institute was held Saturday night February 26th at the Swedish Club, 73rd and Ridgeland in Chicago. Several acts were provided for the entertainment of the guests—among them a magician who thrilled the audience with his prestidigitation; and the two daughters of Harry Tihl, who danced. William Kirby, retiring president was presented with a wrist watch. The arrangements were ably handled by a committee composed of Arthur Nelson, Forest Reeder, L. Greenwald, M. E. Raetzman and Floyd Townsend. D. C. Ellison was master of ceremonies.

◆

New York

The New York State Sheet Metal, Roofing & Air Conditioning Contractors' Association, Inc., has prepared the following resolution on the death of Fred U. Ritter.

WHEREAS we have just been informed of the passing of Fred U. Ritter, Secretary of the Roofing, Metal and Heating Engineers, in Philadelphia and

WHEREAS this comes as a great shock to those who knew him and were acquainted with the excellent services which he has rendered our trade,

THEREFORE BE IT RESOLVED that we, the Officers and Directors of the New York State Sheet Metal, Roofing and Air Conditioning Contractors express our regrets at the untimely passing of so valued a friend; and

BE IT FURTHER RESOLVED that a copy of this Resolution be sent the family, the Philadelphia Association and the Trade papers.

Clarence J. Meyer, Secretary.

◆

Fox Valley, Illinois

The fourth annual meeting and election of officers of the Fox Valley Furnace and Sheet Metal Contractors Association was held on March 31 at the Betsy Ross Tea Room at Geneva. Immediately following a steak dinner, Mr. William Ewert, who just returned from a conference at Springfield with the State Department of Finance, addressed the meeting on the subject of the 3 per cent occupational sales tax giving an interpretation of the recent changes as they effect the furnace and sheet metal industry. Mr. Fred C. Nolting, president of the association for the past two years, was in charge of the meeting. The newly elected officers are:

President—Jack Stowell, Aurora, Illinois.
1st V. P.—Fred Goetz, Elburn, Illinois.
2nd V. P.—Wm. Smith, Geneva, Illinois.
Secretary—Geo. Bushman, Aurora, Illinois.
Treasurer—Wm. Wolfe, Elgin, Illinois.
Sgt. at Arms—Wm. Klinkey, St. Charles, Illinois.

Directors include the officers and Henry Heffelfinger, Oswego; Andrew Lind, Dundee; Walter Jeske, Aurora, and Fred Nolting, Elgin, retiring President.

The organization covering several counties will conduct an intensive educational course for its members along the lines of forced, filtered and humidified warm-air furnaces and air-conditioning including coal, oil or gas-fired equipment for the heating and cooling of homes, stores and churches. Great strides in the field of forced air heating and ventilating have been made in the last five years, and through constant education the furnace men of the Fox Valley as well as elsewhere, have become most proficient and competent to install the very latest in the clean comfortable heating of homes and larger buildings. At the next meeting of the Board of Directors, the standing committees will be appointed and a program planned.

◆

Indiana

The Board of Directors of the Sheet Metal and Warm Air Heating Contractors' Association of Indiana have selected Lafayette as their next convention city for their State Convention, and the dates as February 3-4, 1939, according to announcement of Louis Lehnen president of the State Association. In making their selection of a Convention city, the Board took cognizance of the state-wide interest by heating and sheet metal contractors in Purdue University and its facilities, and of the expressed willing-

Moncrief



MONCRIEF
GAS-FIRED *Winter*
AIR CONDITIONER

Fine Design Makes STRONG SALES APPEAL

Just put ordinary sales ability back of the Moncrief line and you will get extraordinary results. The splendid modern design of Moncrief Winter Air Conditioners needs no elaboration. The eye is more than satisfied; and the pocket-book, too, for you can offer every efficiency-economy feature at prices which represent big values.

Moncrief supplies "Everything used on a warm air heating or air conditioning job." In addition, Moncrief dealers are backed up with every service that contributes in any way to bigger, better business, such as Engineering Advice, Sales and Advertising Helps, and the new Moncrief Special Finance Plan.

The Moncrief Line Includes

Winter Air Conditioners for Gas, Coal or Oil.

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Cast and Steel Furnaces.

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Pipe, Fittings and Accessories for both gravity and air conditioning.

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Miles Junior Air Conditioners.

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Moncrief Blower-Filter Units.

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Send for particulars of the Moncrief Proposition.

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Oil-n-Aire
WORLD'S MOST BEAUTIFUL
OIL BURNER



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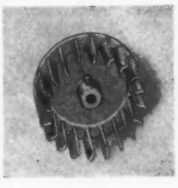
2 - EASIEST TO SERVICE

Here's the burner to incorporate with your heating equipment — Oil-n-Aire. Outstanding performance . . . striking beauty . . . and quality in keeping with the finest heating and air conditioning equipment of today. Gives you tomorrow's features today:

1. **Precision machined throughout.**
2. **Removal of one screw gives access to electrical assembly. Blast tubes, fan, fuel pump, motor easily removed. Clean strainer in five minutes.**
3. **Extra weight eliminates vibration. Balanced three-point mountings.**
4. **Direct contact electrodes—no high tension leads.**
5. **Convertibility — interchangeable fans and blast tubes. Capacity 1-3 or 2-6½ gal. per hour. Two burners in one.**

GET the FACTS on Oil-n-Aire for more and easier sales.

EQUIPPED with ALDRICH Self-Cleaning FAN and New A-C "Fuel-Pak" FUEL UNIT



Aldrich self-cleaning fan —can't collect dirt and change air adjustment . . . peak performance always.



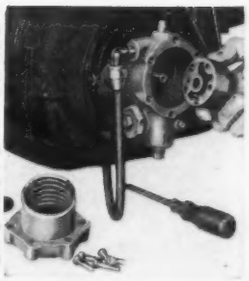
The pump is a separate and replaceable unit totally enclosed in a compartment connected to supply tank, never subjected to pressure. If pump leaks—leak is caught in this chamber instead of running on floor.

•

(above, right) World's greatest fuel unit makes all others obsolete. Cut-off "sharp as lightning . . . positive as Fate."

•

(right) Picture shows pump removed. Simply slip it on the shaft. Easier than cleaning a strainer. No replacement delay — no transportation charges. Outlasts a dozen others.



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For a Warm Air Furnace Equipped with a Blower



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There's a lot of satisfaction and profit, too, in selling a product you know is RIGHT. That's why so many furnace men are selling the Cook 218 Control System for warm air furnaces equipped with blowers.

It performs efficiently. Operates safely. And does its job year after year at low cost. Experience proves it! Its installation is simple, easy, inexpensive. The system comprises the thermostat, the central control box which is arranged for easy wiring and the bonnet switch which includes limit, fan and safety switches all in one unit.

Make the 218 a symbol of your service—and a source of profit and customer satisfaction. We'd like you to know all about the 218. Write today for details.

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COOK CONTROLS
THERMOSTATS—FURNACE LIMIT CONTROLS
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2674 Southport Ave. CHICAGO

Association Activities . .

ness of the University to cooperate in the education and enlightenment of this trade. It is anticipated that something of unusual interest and value along this line will be worked out for the Convention.

Lafayette has never before entertained the State Convention but it has been host to several very successful District Meetings. The City of Lafayette contains a sizable number of up-to-date sheet metal and furnace shops, and these are supplemented by many others in the surrounding territory. The cooperation which these contractors have assured President Lehnen of will make certain a successful convention. Paul R. Jordan, Executive Secretary.

◆

St. Louis

The Associated Sheet Metal, Air Conditioning, and Heating Association, Inc., of St. Louis, has plans for the new year well under way under the leadership of the new officers. They are looking forward to an increase in membership. There is always a standing invitation of those who are interested in joining the association for the benefits they can derive.

There is an educational meeting on the second Monday of the month, conducted under the direction of the St. Louis Wholesalers and Jobbers Association. The regular meeting for the sheet metal contractor is held on the fourth Monday of each month for the discussion of the different problems that arise among the trade. An endeavor is made to have an outstanding speaker at this meeting. R. A. Tucker, Smoke Inspector of St. Louis, outlined his duties at the recent meeting and defined what the furnace contractor was supposed to do to help eliminate the smoke. Attendance at the last meeting was around the one hundred mark.

An invitation is extended to those interested to join.

B. Kolbenschlag, Treasurer.

◆

Elgin, Illinois

The furnace men of Elgin, Ill., were surprised to note the purported passage of a new smoke abatement ordinance to be put into effect at the end of 30 days. One paragraph in the new ordinance reads as follows: "No hot air furnace shall be installed and no residence or apartment shall be altered or changed to provide for the heating of facilities for more than two apartments from a single hot air furnace." This provision if carried out would be a distinct blow to the up-to-date methods of forced warm air heating, leaving the door wide open for other than warm air types of heating, a clear discrimination against the furnace and air-conditioning installers. The furnace men of Elgin were not aware of nor consulted in regard to this ordinance prior to the newspaper's report of its adoption. A committee appointed by the president of the Fox Valley Furnace and Sheet Metal Contractors Association, hurriedly went into consultation and arranged for a meeting with the Mayor who thereupon informed them that the ordinance had not passed its final reading and hence really was not yet a law, and upon the urgent request of the committee for the striking out of the undesirable provision, consented to withhold further action by the council until an opportunity be given to go over the section of the building code pertaining to heating, with a view of bringing it up-to-date. The committee—William Wolff, Chairman, Clifford Juby and F. C. Nolting—offered their services in this respect and will aid in the revision of this city ordinance.

◆

Ohio State

The Sheet Metal Contractors Association of Ohio will hold their annual convention on April 19, 20 and 21 at the Deshler-Wallick Hotel, Columbus, Ohio.

There will be a program and entertainment.

An invitation is extended to all sheet metal contractors in Ohio and vicinity to attend.

Harry Hollman is president and Lee W. Gillespie is secretary and treasurer of the Auxiliary.



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Package Unit Furnace Blower

Less Than $40.

1,000 C.F.M. Capacity

- Shipped Assembled
- Large Access Door
- Automatic Cut-Out on Motor
- Two 15" x 20" Filters
- Leak-Proof Filter Frames
- Low Speed—High Pressure
- Self Lubricating Bearings
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- ⅙ H.P. Long Hour Motor
- Effective Summer Cooling

A Complete Blower

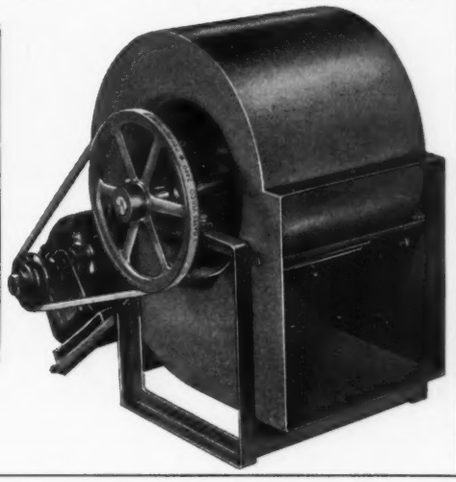
(not a fan)

1,000 C. F. M.—large enough to remedy the many thousands of unsatisfactory gravity jobs now installed *at a low cost!* Shipped assembled ready to install!

BLO-ETTE is also sold less casing, filters and motor.

NITEAIR *for Summer Cooling*

An attic blower (not a fan) for night air cooling. Write now for complete data and prices.



The Lau Blower Company
Dayton, Ohio



Your Move!

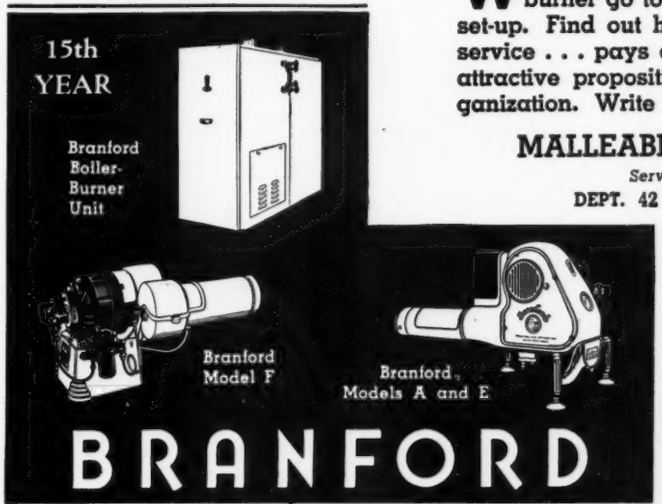
BE PREPARED TO HOLD YOUR TRADE BY HANDLING A GOOD OIL BURNER

WHERE you furnish new heating systems don't let the oil burner go to a competitor. Get in with the new Branford set-up. Find out how Branford helps survey, sell, install and service . . . pays at once in cash when job is completed. An attractive proposition, a fine burner, backed by a strong organization. Write now for details.

MALLEABLE IRON FITTINGS COMPANY

Serving the Heating Industry for 74 years

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YES, SEND IT ALONG

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DEPT. 42, BRANFORD, CONN.

Gentlemen:

Your proposition sounds right. Please send us complete information.

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On every count the decision goes to Combustioneer as it puts the Kayo on competition and leads all the way in the field of Automatic Coal Heating.

IT'S Combustioneer —THE PIONEER

1 *Proved* engineering—research—and complete manufacturing and testing facilities *under one roof* protect your reputation.

IT'S Combustioneer —THE PRECISION-BUILT

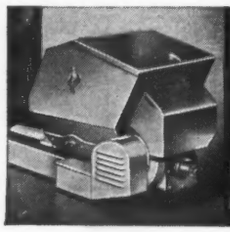
2 Highest standards of precision-built manufacture insure dependable and economical operation.

IT'S Combustioneer —THE SALES LEADER

3 Nine *exclusive* and demonstrable construction and convenience features give you unquestioned sales leadership.

IT'S Combustioneer —THE PROFIT MAKER

4 Sound price and discount structure, powerful sales plans and national advertising assure you bigger, quicker profits. Write for details to Combustioneer, Springfield, Ohio.

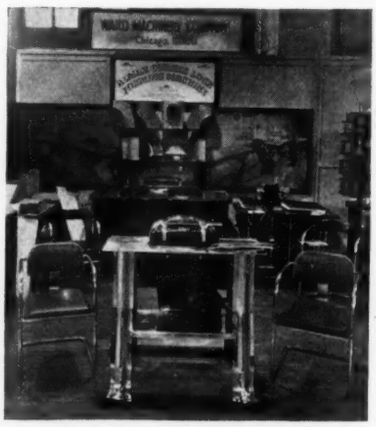


Combustioneer
AUTOMATIC COAL BURNER
FOR HOMES, APARTMENTS AND FACTORIES
DIVISION OF THE STEEL PRODUCTS ENGINEERING CO.

With The Manufacturers . .

Ward's Almar Exhibit

Ward Machinery Co., 564 W. Washington Boulevard, Chicago, exhibited and displayed the Almar corner lock forming machine at the recent Heating and Ventilating



show in New York City. The equipment was especially nickeled for display purposes and exhibited in actual operation. Descriptive literature of the Almar is available.

◆

Air Conditioning School

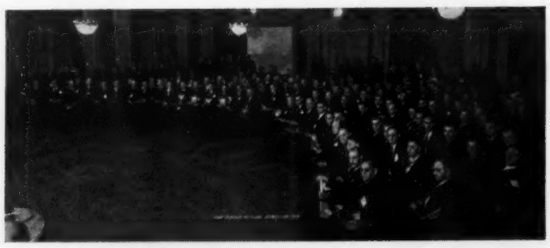
The Sioux Steel Co. of Sioux Falls, South Dakota, sponsored a four-day air-conditioning school the first four days of March at their factory. Eighty-two of the dealers from Iowa, Minnesota, and South Dakota attended this school, where they were given extensive instruction in the servicing of automatic air-conditioning equipment.

H. F. Brown, Chicago, District Sales Manager of the Link-Belt Company, held a class in "Stoker Installation." E. C. Maire, Chicago Manager of the Penn Electric Switch Company, presented a class in electric controls, as did also Gerald Peterson of the Minneapolis-Honeywell Company. W. W. Hallinan, Dowagiac, Michigan, designer of the Round Oak oil burner, together with T. W. Russell, Minneapolis, of the L. J. Mueller Furnace Company gave instructions regarding oil burner installations.

◆

Rudy's 1938 Clinic

Rudy Furnace Company's fifth annual dealer engineering Clinic, held March 7 and 8 in the Oliver Hotel, South Bend, Ind., drew more than 300 Rudymen from 28 states to make it the largest dealer meeting in the Company's history. Representatives from as far west as Tacoma and as far south as the Carolina's attended.



High spots of the meeting included sales training work under the direction of Prof. Paul W. Ivey, head of the Merchandising Department, University of Southern California, an engineering discussion under the direction of Prof. S. Konzo, Special Research Assistant of the University of Illinois Engineering School, and a course in heat loss calculation and figuring forced air jobs by a new and shorter method under the direction of John S. Cunningham, Assistant Rudy Engineer.

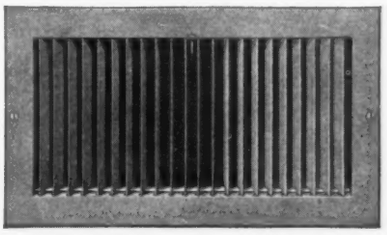
An extensive program covering servicing for automatic heat jobs occupied a major portion of the meeting.

Dura-Flo and Fin-Flo

Registers Meet

Your Air Conditioning Needs!

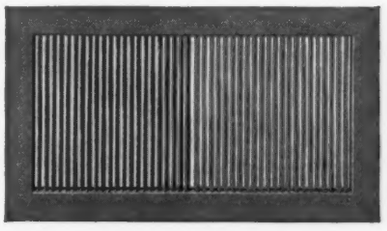
These two new Auer models have been very well received by the trade. They are especially designed for modern forced air systems of heating or cooling. Great structural strength, yet open area is approximately 80%. Their simplicity of design harmonizes with the modern decorative trend. Dura-Flo and Fin-Flo models come in all desired sizes and finishes, standard or narrow mesh, for baseboard or wall, slide or band frame—*any air directional effect you wish.*



Dura-Flo

●

Fin-Flo



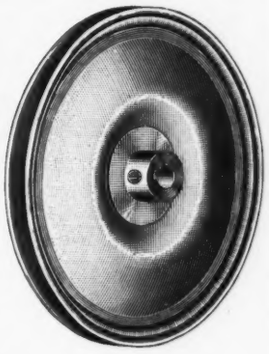
● *Ask for NEW CATALOG 38—Showing greatly enlarged AUER line of Registers, Intakes and Grilles for all heating and air conditioning purposes.*

THE AUER REGISTER COMPANY, 3608 PAYNE AVENUE, CLEVELAND, OHIO

AUER DISTINCTIVE REGISTERS & GRILLES For Air Conditioning *and* Gravity

MAUREY
STEEL V-PULLEYS

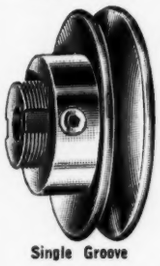
Specially Designed for High Efficiency Operation with STOKERS, BLOWERS, FANS, REFRIGERATION, AIR CONDITIONING and Other Domestic Units



Balanced, true running and quiet at all speeds. Built to give long trouble-free service under severest use. Made with heavy rolled steel edges and SOLID STEEL or malleable iron hubs, machined. Carried in stock for "A" and "B" belts, in a wide variety of sizes. With DOUBLE GROOVE as well as single groove.

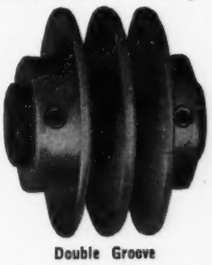
No Die Cast Hubs Used in MAUREY Pulleys.

MAUREY Variable Pitch Diameter Pulleys



Single Groove

Solid steel construction. Adjustment permits speed variation of as much as 30%. Designed for Air Conditioning Units. Solid steel—not die cast. Made in 4 sizes, 3¼" to 4½ inches in diameter.



Double Groove

MAUREY MANUFACTURING CORP.
Wabash at 29th Chicago, Ill.

PERFORATED METALS

Every Sheet Metal Worker needs perforated metal in one form or another.





Everything in perforated metal.

Finely perforated brass and tin-plate can be shipped quickly from our stock. In brass these sizes include No. 00 holes (.020" in diameter) to No. 8 holes (.138" in diameter); in tin plate—No. 1 holes (.027" diameter) to No. 8 inclusive.

You may find it convenient to draw upon this stock.

Aluminum, monel metal, copper, or other metals are perforated to order.

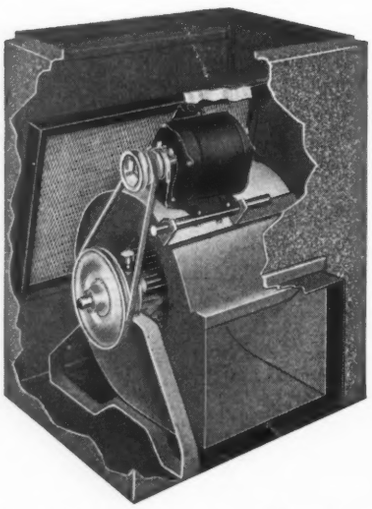
For processing food products and to withstand certain chemicals special alloys are offered. Write us if you have such problems.

The Harrington & King PERFORATING Co.

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

No Other Furnace Blower Offers so Much!

REX AIR-PAK



NEW JUNIOR MODEL NO. 100 **$39.95**

- Business you could not touch before, such as the home renter and the home owner of limited income, is now ready and waiting for you.
- The entire unit is completely assembled in one package.
- Small and compact, it can be carried into the home and quickly demonstrated how cool air is provided in summer, and clean, healthful warmth to every room in winter.
- The exceptionally low price brings it within reach of every home with a warm air furnace.
- Four speed pulley provides four different air capacities to meet the requirements of different type homes.

THIS COUPON WILL BRING COMPLETE INFORMATION!

AIR CONTROLS, INC.
Div. of The Cleveland Heater Co.
1933 West 114th, Cleveland, Ohio

NAME .....

ADDRESS .....

CITY ..... STATE.....

A.A. 4-8

With the Manufacturers . . .

Marley Moves

The Marley Company, formerly located at 1915 Walnut Street, Kansas City, Missouri, announces their removal on March 15th to larger quarters with better facilities in their new warehouse and office building at 3001 Fairfax Road, Kansas City, Kansas, in the Fairfax industrial district.

Tanner President of Milcor

At the annual meeting of the Milcor Steel Company on March 7, 1938, Earl A. Tanner, formerly executive vice-president, was elected to the presidency of the company. Louis Kuehn, former president, was named chairman of the board, a newly created post. E. L. Lipman was chosen to succeed A. J. Luedke as secretary and treasurer. Mr. Luedke recently resigned.

Mr. Tanner, the new Milcor president, has been associated with the company for 18 years. At 42 years of age, he is one of the youngest heads of a major industry. He started in the sales department of the company and was made manager of jobbing sales shortly afterward.

Gas Furnaces Fly to Convention

Three Payne floor furnaces, incorporating new features in gas heating design, had been rushed to completion in the Beverly Hills plant of the Payne Furnace and Supply Company for an initial showing at the March sales conference of the Montana-Dakota Utilities Company at Miles City,



Montana. Rail traffic had been disrupted by the worst storm in California history. One day before the convention was to open, the shipment was traced and returned, and together with display equipment were loaded into a huge Douglas Mainliner Transport and flown to Salt Lake City where they were rerouted to Butte, Montana, by Railway Express, and then to Miles City by special express truck. The shipment weighed 632 pounds.

Eastern Representatives

Grant Wilson, Incorporated, 4101 West Taylor Street, Chicago, has just concluded arrangements for the distribution of Dux-Sulation in the east and has established Air Conditioning Utilities Co., 8 West 40th Street, New York City and 110 Arlington Street, Boston, Mass., as special factory representative.

Harry W. Fiedler is the directing head of this organization. The Boston office is in charge of Warren R. Devine.

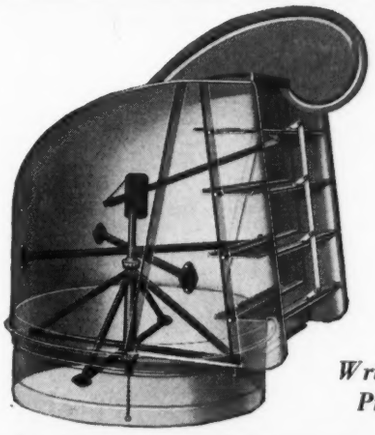
Mercoid Executive Personnel

The Mercoid Corporation, 4201 Belmont Avenue, Chicago, elected Hugh Courteol president at the annual meeting on February 15.

I. E. McCabe, who has been chief engineer of the company since its beginning, is now chairman of the board of directors. He will, however, continue to be in active charge of the engineering and development work of the company.

Hugh Courteol has been associated with General Motors for the past 18 years.

J. W. Owens is executive vice president in charge of sales. R. H. Chadwell was elected treasurer and Thomas P. Crawford as secretary.



Write for Prices

7 SUPERIOR FEATURES

1. Low slung vane—less overall height—enhances appearance and holds ventilator absolutely steady in the wind.
2. New curved body—essentially modern lines. Provides the ultimate in efficient operation with minimum air travel friction.
3. Elliptical steel tubing interior members *welded* into a one-piece frame—the strongest and most rigid construction known. Impossible to disjoint.
4. Oversize outlet—provides extra large capacity under all operating conditions.
5. Wind play on *three* sides of opening—*three-fourths* of discharge area (much more than on ventilators of other types)—gives greatest possible suction effect from outside wind currents. You get more capacity per size.
6. Stainless steel ball bearings in small-size fully enclosed dust-proof housing—assures a life time of trouble-free operation—and *no lubrication required.*
7. Outside Louver Dampers never let dust fall into the building.

The NEW Swartwout ROTARY BALL BEARING VENTILATOR

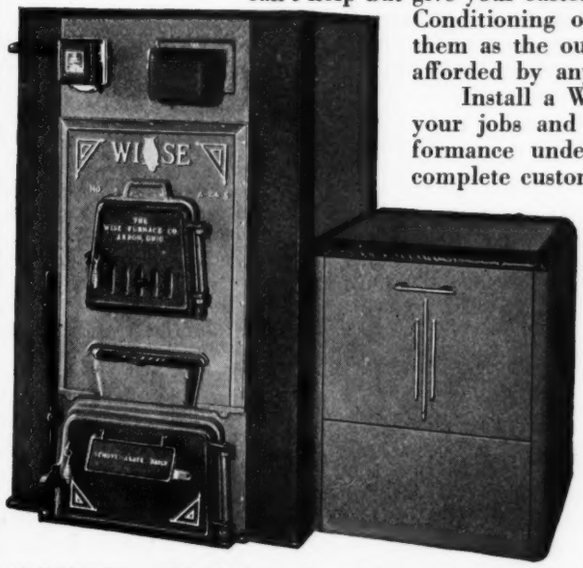
◆

THE SWARTWOUT COMPANY
18615 Euclid Ave. Cleveland, Ohio

Cash in on AIR CONDITIONING with the COMPLETE **WISE** LINE

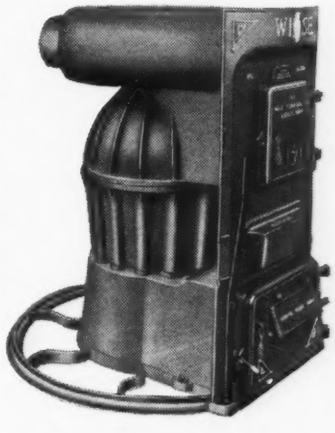
Competition will be keen in the Air Conditioning and Heating field this season, and the edge will go to the contractors who can give the "most for the money." You can't help but give your customer the best of the bargain when you install WISE Air Conditioning or Gravity units. Their peerless performance ranks them as the outstanding line in the field, but *still* at a price easily afforded by any homeowner.

Install a WISE Air Conditioning unit or Gravity furnace on *all* your jobs and be sure of peak performance under any conditions and complete customer satisfaction.



Shown at left is the modern WISE Air Conditioning unit for coal or gas. A real air conditioner for modern homes.

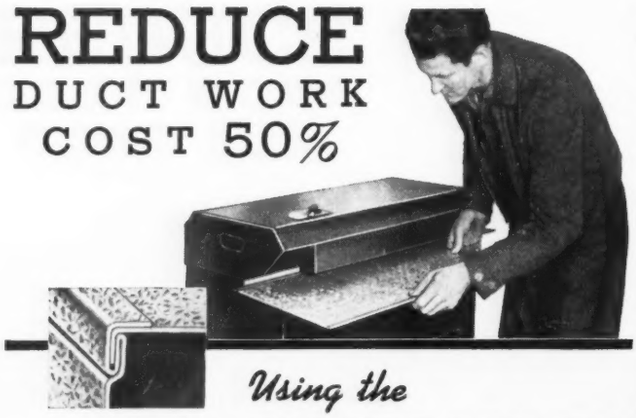
At right is the WISE Series A — containing everything necessary for perfect economical heating. A money-maker for you.



Write today for literature on the complete WISE line. A postcard will do the trick.

WISE FURNACE COMPANY - AKRON, OHIO

REDUCE DUCT WORK COST 50%



Using the

KOR-NER-LOK (22) FORMING MACHINE

facts about
KOR-NER-LOK
Forming Machine

- Forms up five, 8-ft. sheets in 2 minutes—one man on the job, doing it in a single operation! Ordinarily it takes two men 45 mins. and 7 operations to do this work with old style equipment.
- Saves material—on every lock, you save ½" material. You use only ¾" for a lock instead of 1 ¼".
- Makes stock fittings—one man can make up as many as 30 fittings per day, conveniently and economically.
- More jobs—these neat, workmanlike, uniform jobs meet architect's approval—permit you to bid on residential work, too, and make good profits.
- Other Machines—Nos. 20 and 18—for heavier gauge material.

You can bid closer and still make good profits—meet and beat competition with this compact, easy operating Binkley Kor-Ner-Lock No. 22. . . . You can turn out neater work faster. . . . Make Pittsburg or Corner Locks at rate of more than 30 feet per minute. . . . For rectangular pipes, fittings for heating, ventilating and air-conditioning jobs.

And, this No. 22 saves a half inch of material on each seam—another saving that builds your profits. Learn how others are making real money. Investigate the profit-making applications of the Binkley Kor-Ner-Lok No. 22 now, before the busy season starts. Or, if you are interested in larger machines, ask about Kor-Ner-Lok No. 20 and No. 18, for 20 and 18 gauge—⅜" and ½" seam, inclusive.

Let Us Send You Prices and Literature— Write for Bulletin A-1

BINKLEY MANUFACTURING CO.
WARRENTON, MISSOURI

H&C DAMPER REGULATOR SETS



BRACKET TYPE

With ¼" Bearings as shown No. 50¼. ⅜" size No. 50⅜.



DISK TYPE

With ¼" Bearings as shown No. 80¼. ⅜" size No. 80⅜.

¼" sets have snap end bearings for easy installation of small dampers. All sets may be used with either splitter or regular dampers. All parts have rust-proof finish. Insure satisfactory installations by using H & C Damper Regulator Sets. All leading jobbers carry them.

HART & COOLEY MFG. CO., 61 W. KINZIE ST., CHICAGO, ILL.

With the Manufacturers . . .

Hall-Neal Convention

Representatives of the Hall-Neal Furnace Company from eight different states were guests for two days recently at the factory, 1324 North Capitol Avenue, Indianapolis, Indiana.

Highlights on the convention program included talks by Professor J. D. Hoffman of Purdue University, chairman of the Code Committee of the National Warm Air Heating & Air Conditioning Association; W. A. Kemp, Chicago, oil burner engineer; C. V. Robinson, Louisville,



Kentucky, gas heating engineer; and heating engineers of the Hall-Neal Furnace Company.

New developments and improvements in methods of estimating and installing warm air furnaces were discussed.

A feature of this year's dealers convention was the display of Victoraire heating and winter air conditioning apparatus incorporating fuel-saving heat radiating fins, a patented feature of the Hall-Neal Furnace Company. This display included special furnaces for oil burning, gas burning and stoker firing as well as hand firing and were displayed in modernistic cabinet casings finished in a beautiful grey enamel as well as in the conventional galvanized casings.

It was also pointed out that general remodeling and replacing of old and out of date home heating equipment will widely interest home owners this year which may be financed at low interest rates under the FHA plan with three years to pay.

◆

May Vice-President of Young

F. M. Young, president of Young Radiator Company, Racine, Wisconsin, manufacturers of heat transfer products for heating and cooling in the air conditioning industry, announces the appointment of M. F. May as vice-president.

In recent years Mr. May has done considerable development and experimental work in connection with air conditioning and the use of well water as the cooling medium.

◆

Holds Sales Conference

The J. M. & L. A. Osborn Co. held a two-day sales conference at the Cleveland Chamber of Commerce on January 6th and 7th. The discussion included the complete selling and merchandising plans for the ensuing year and all officers and salesmen of the Cleveland, Buffalo and Detroit Divisions attended.

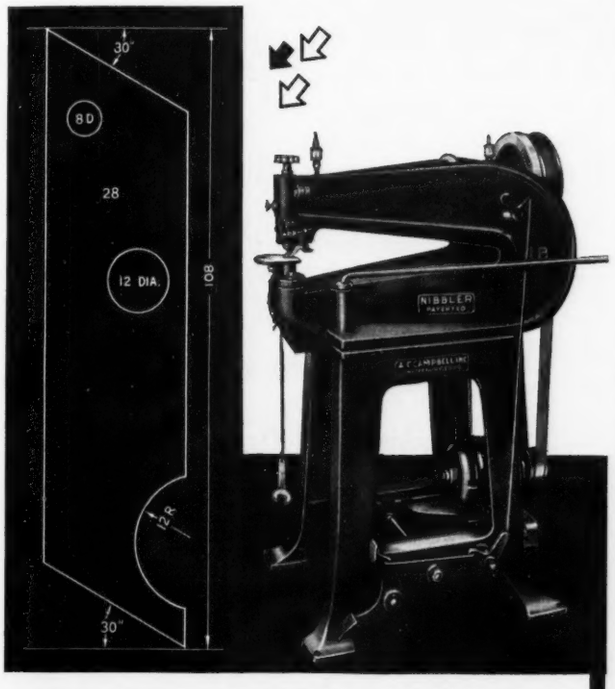
A. W. Howe is president of the company.

The group meetings were attended by approximately 65 men and closed with a dinner and theatre party.

◆

D. E. (Ned) Cummings

The Lennox Furnace Co., Marshalltown, Iowa, has appointed D. E. (Ned) Cummings Western sales manager. Mr. Cummings has a long and successful record in the furnace business. For the past nine years he has been manager of the Western division of the Richardson & Boynton Company. For eight years before that he managed the Western branch of the Thatcher Furnace Company. Preceding then he was on the road for Thatcher for five years and even before then he worked in a furnace and sheet metal shop in Sioux City, Iowa.



CAMPBELL NIBBLER

cut this shape in 12 minutes!

323 inches of cutting in only 12 minutes, the complete production of a sheet metal part 9 feet long, with accurate inside cutting—was only a "run-of-shop" job for the Campbell Nibbling Machine.

Irregular shapes in steel or other metals up to one-half inch thick are cut in much less time, at less cost, than by any other method. Materials suffer no distortions, internal strains or microscopic fractures. Edges have no burrs and need little or no finishing.

In tool rooms, experimental departments and for many production operations, Campbell Nibbling Machines are eliminating costly dies for short runs and bringing about many other economies.

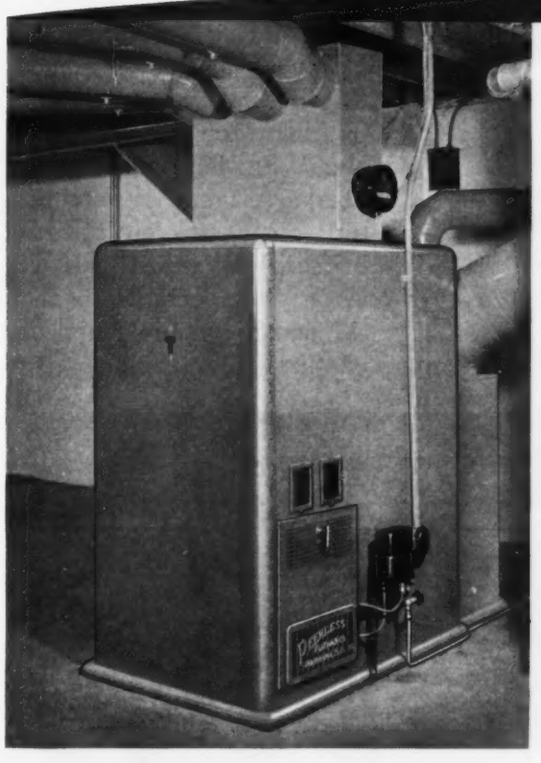
ACCO

ANDREW C. CAMPBELL DIVISION
AMERICAN CHAIN & CABLE COMPANY, Inc.
DESIGNERS AND BUILDERS OF SPECIAL MACHINERY
BRIDGEPORT, CONNECTICUT

In Business for Your Safety

CAMPBELL
Material Cutting
MACHINES

★ AMAZING NEW OIL OR GAS FURNACE HAS "EVERYTHING" CUTS COSTS IN HALF



TREMENDOUS OPPORTUNITY for DEALERS in SMALL HOME FIELD

Pictured above is the "ACE"—an entirely new completely automatic winter-air conditioning unit—with blower, filters and controls. Sells at just about half the price of other oil or gas units, with liberal profit margin for dealers. Uses sensational two-ring and pilot "blue flame" burners developed by ABC—or remarkably efficient gas burner. Fuel costs little, if any, more than coal. Installed in basement or at floor level. Heats up to 8,000 cu. ft. of space. Entire unit "made to order" for new housing program and F. H. A. Installations can be made now, payments to start September first. Get profit-making facts TODAY.

PEERLESS FOUNDRY COMPANY

PEERLESS FOUNDRY CO.
INDIANAPOLIS, INDIANA

Send illustrated literature about new ACE—and your dealer proposition at once.

Name .....

Address .....



Whether you use RANDALL BEARINGS for QUIETNESS or EFFICIENCY, you get both!

Quiet

When Randall Bearings are used in air conditioning blowers, contractors and distributors are assured of freedom from complaints about bearing noises and bearing failures. These problems are completely solved because Randall Pillow Blocks run efficiently, quietly and without metallic bearing noise.



Randall Standard Pillow Block (single reservoir) with large special oiler.

Randall GRAPHITE PRODUCTS CORP.
Dept. 411, 609 W. Lake St., Chicago, Ill.



With the Manufacturers . .

Edward P. Hayes

Edward P. Hayes has been appointed general manager sales for The Fox Furnace Company, Elyria, Ohio, according to C. A. Olsen, president.

◆

Spahr Joins Perfex

The Perfex Corporation, Milwaukee, manufacturers of automatic controls, announces that D. G. (Jerry) Spahr has joined the organization, with headquarters at Columbus, Ohio, and in addition to covering this territory will also act as a factory sales representative in other sections of the country for Perfex.

◆

Machine Tool Dealer

L. L. Richards Machinery Co., Milwaukee, Wisconsin, recently was incorporated as a machine tool dealer to serve the Wisconsin territory. The company will handle well-known lines of machine tools, specializing in metal-working equipment.

C. R. Daniels, formerly in the sales department of Jos. T. Ryerson Sons Co., has joined the new organization.

◆

Bach Represents Pecora

Pecora Paint Company of Philadelphia now maintains a warehouse stock in Birmingham, Alabama, to expedite service to customers in the South under the supervision of W. J. Bach, 2321-2329 North 29th avenue, Birmingham.

◆

Stiglitz Revives Kentucky Stove

Stiglitz Furnace and Foundry Co., Inc., 2007 Portland Avenue, Louisville, Kentucky, announces the purchase of patterns, flasks and equipment of the Kentucky Stove Company, who manufactured stoves in Louisville for the past forty years. Plans are to revive this entire line as well as to furnish repairs for any stove.

◆

Gar Wood Inaugurates Service Policy

Gar Wood Industries, Inc., Detroit, Air Conditioning Division, announces the inaugural of a pay-in-advance, one-year service arrangement for Gar Wood users.

The policy includes the inspection, cleaning and lubrication of the burner, adjustment of controls, the cleaning of furnace or boiler flues and the checking of the boiler assembly.

◆

40 Years Old or Over

One-third of the employees of The American Rolling Mill Company, Middletown, Ohio, producers of sheet iron and steel, are 40 years old or over, an analysis of the company's employees by age groups revealed on December 31. Twelve per cent, or approximately one-eighth, are 50 years old or over.

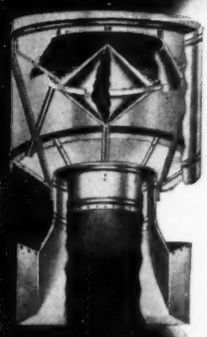
The analysis covers 10,800 employees of the parent company who carry group insurance, practically the entire working force in the Armco plants in Middletown, Zanesville and Hamilton, Ohio; Ashland, Ky., and Butler, Pa.

Of the 33.7 per cent of employees who are 40 years old or over, 12.5 per cent are 40 to 45; 9.1 per cent are 45 to 50; 9.2 per cent are from 50 to 60; 2.5 per cent from 60 to 70; and 0.4 per cent are over 70.

Charles H. Murray, Director of Personnel, said in making public the analysis:

"Of course, there are fewer men 40 years old and over employed than there are younger men, but then there are fewer of them in proportion to population. Our older men have been with us for years and many of them have worked their way from ordinary jobs to positions of responsibility. Their experience is valuable both to themselves and to the company. They hold the best jobs and have the greatest responsibility, which is contrary to the opinion of many people."

BURT VENTILATORS



"MORE AIR PER DOLLAR"

You can give your customer "more air per dollar" in any type of ventilator he may need. The Burt line is complete—a type and a size for every purpose; designed right, substantially made and priced to give big value. Our Engineering Department is always glad to help you figure. Send for catalogs.

"FREE-FLOW" GRAVITY VENTILATOR

THE BURT MFG. CO.

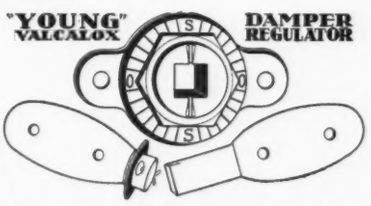
ROOF VENTILATORS • OIL FILTERS EXHAUST HEADS

301 MAIN STREET • AKRON, OHIO

The "LAST WORD" in Damper Regulators

The consensus of opinion among hundreds who have seen or used the new "YOUNG" Valcalox Damper Regulator is that it is the LAST WORD. There is nothing else like it—nothing that will do all it does. The 231 serrations on dial and base POSITIVELY prevent slipping. There are 16 Points of Superiority in this new outstanding and revolutionary Damper Regulator. All we ask is that you TRY THEM ONCE. We know they will end your regulator troubles. USE ON YOUR NEXT JOB. ASK YOUR JOBBER.

Try Them ONCE



Patented
Pat. Pending

5/16" square rod Regulators are 16c each —with bearings, rivets, and screws, 22c each. Net trade prices. Also made in 3/8" size. Come packed twelve in a box with one wrench.

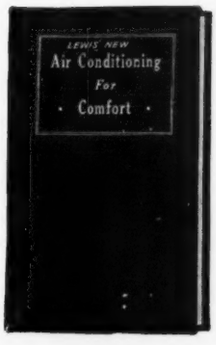
16¢ and 22¢ each

Ask Your Jobber or Write

YOUNG REGULATOR CO.

4500 Euclid Avenue Cleveland, Ohio

KNOW AIR CONDITIONING



Learn every phase of this important subject by sending today for a copy of

LEWIS' NEW "Air Conditioning for Comfort"

by SAMUEL R. LEWIS

277 *Pages*—$2.50
Large Psychrometric Chart

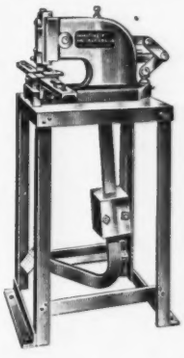
So understandably does this new volume cover all angles of air conditioning that already dozens of schools teaching air conditioning have adopted it as a text. From it anyone may quickly acquire a thorough knowledge of equipment, psychrometry, refrigeration, humidification, dehumidification, heat transmission, heat absorption, air distribution, and water circulation. It also explains every step in the design of a complete heating and cooling system for a typical residence and a typical commercial building.

Send $2.50 for a copy today. You may return the book and your money will be refunded promptly if it does not prove satisfactory in every way.

KEENEY PUB. CO. • 6 N. MICHIGAN • CHICAGO

BENDING BRAKES **WHITNEY-JENSEN** METAL TOOLS

KICK PRESSES



• PUNCH 100 holes per minute with one of these fast-action, moderately-priced, powerful, accurate, durable Foot Presses. Capacity 2" hole in 16 ga. metal. Four sizes, by throat depth: No. 28, 7"; No. 29, 10"; No. 58, 18"; No. 68, 24". Write for prices and full specifications.



Nos. 7, 7⅛, 8—Imperial ROLLER BEARING

PUNCHES

• Positive stripping, will punch and strip inside 90°. Quick-change punches and dies. No cams to wear out. Three sizes, capacities ¼" hole in ⅛", 3/16", and ¼" metal.

No. 2 SHEAR

• Patented eccentric gear delivers same cutting power at blade tips as at throat of jaws. Inserted, renewable tool steel blades. Capacity, ⅛" metal or lighter. Will slit large sheets.



WHITNEY METAL TOOL CO. • 91 Forbes Street, Rockford, Illinois



Can be suspended from ceiling as shown, or floor mounted. Few if any building alterations required in order to install.

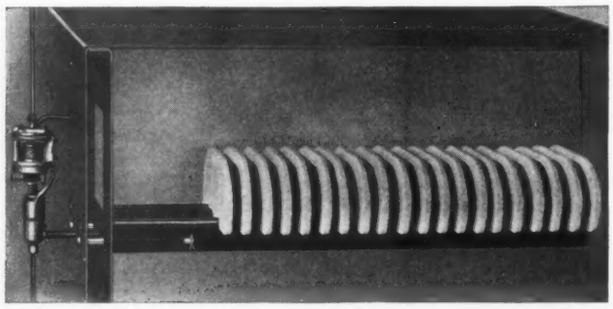
Ideal for Stores, Cafes, Theatres, Offices, etc.

Last word in low-cost air conditioning. Easy to sell—and they stay sold because of guaranteed performance. Backed by 25 years' experience. Wide range of combinations—a unit of proper size and capacity for practically any cooling, heating or complete conditioning need. Quiet in operation.

Sizes up to 15,000 CFM. *Write for Bulletin 107.*

SPECIFY CLARAGE for COMPLETE AIR CONDITIONING • VENTILATION • HEATING • COOLING • MECHANICAL DRAFT • FANS & BLOWERS FOR INDUSTRIAL NEEDS

CLARAGE FAN COMPANY • Kalamazoo, Mich.
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES



AUTOMATIC JUNE
HYDRO-METRIC HUMIDIFYING SYSTEMS

Graduate humidity with relation to outside temperatures so that even in coldest weather there is no annoyance from frosted weeping windows; and ample evaporation is supplied even at the low bonnet temperatures in mild weather. It is a complete humidifying system, simple, trouble-proof. Send for literature and prices.

MONMOUTH PRODUCTS CO.
1933 E. 61st St., Cleveland, Ohio

News Items . . . . . .

Adds Air Conditioning Department

Tennison Manufacturing Company, manufacturers and wholesale distributors of Houston, Texas, with office and factory at 1901-1907 Franklin Avenue, announce an air conditioning department under the management of Gilbert E. Olson. This department will specialize in duct design and the fabrication of air conveying systems. They will act as distributors for air conditioning supplies and accessories.

They have one of the finest equipped shops and factories in the South specializing in air conditioning equipment.

◆

Oil Burner Engineering

To round out its home-study courses in the field of heating and ventilating, Rutgers University is now offering a course in Oil Burner Engineering in fifteen sections or lesson assignments.

Already available were the newly-revised Air Conditioning course and one in Heating and Ventilating. The brief announcement of the University Extension Division at Rutgers states that the course, "intended for service men, salesmen, mechanics, electricians and engineers, presents the fundamentals of Oil Burner Engineering in a text especially adapted to individual study. It includes many practical charts and diagrams for lay-out of oil burner systems, automatic control devices, trouble charts of motors, calculation of heating requirements, and heat insulation of walls, roofs, and floors in old as well as in newly-constructed buildings. An unusually complete listing of the various types of oil burners is an additional feature. A section is devoted to the essentials of heating equipment, air-conditioning and other developments in this rapidly growing field."

Full details of the course may be obtained by addressing the Rutgers University Extension Division at New Brunswick, New Jersey—N. C. Miller, Director.

◆

Obituary

Fred U. Ritter

American Artisan announces with sorrow the sudden death on March 21, of Fred U. Ritter, Secretary of the Roofing, Metal and Heating Engineers association of Philadelphia. Less than two weeks previously, Mr. Ritter addressed the New York state convention in Buffalo on shop cost records.

Fred U. Ritter accepted the position of full time Secretary of Roofing, Metal & Heating Engineers of Philadelphia, Pa., on May 10, 1924, and continued in this position until his death. Mr. Ritter was an accountant with a prominent building contractor before joining the association as its secretary. His quiet, calm nature; friendly spirit made him a host of friends both in the industry and outside of it.

Upon joining the association he visited every member's shop and some others in order to determine how he could best serve the interest of the trade and after several years of strenuous work in the shops straightening out the bookkeeping systems and forms. He attributed the greatest loss in the average shop to the inability to find and distribute shop expense properly among the bills. This belief led him to design and establish the "Ritter Easy Bookkeeping System" which is used very successfully in several hundred shops in the trade and other trades and business as well. His intimate relationship and character gained the respect and admiration of all the industry. His experience made him a valued counsellor and silent partner to many. He never broke a confidence.

His years of patient work among the trade, always cheerfully rendered, proved the one way in which the trade standard could be raised to a profitable basis through cooperative effort; his many reports, collected statements of business year after year were practical proof of his theory.

AMERICAN LOUVRE DAMPERS



Angle or channel frame. Ball bearing or pin bearing type. Furnished to fit any size opening — for either manual or motor operation. Indispensable to the complete air conditioning or ventilation installation. Drop us a line today for further information. Check list below for other well built AMERICAN items.

OTHER AMERICAN PRODUCTS

Warm Air and Ventilating Grilles
Fused Link Fire Dampers and Screens
Multiple Louvre Dampers and Screens
Single Leaf Volume and By-pass Dampers
Mixing Dampers

The American Warming & Ventilating Co.

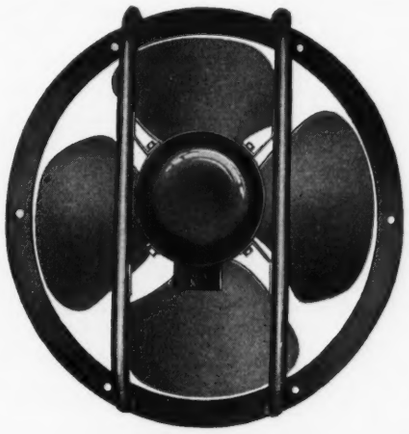
1017 Summit Street, Toledo, Ohio
663 Broadway, New York City

WAIT FOR THE BIG NEWS* ON KŌL-MASTER Stokers



*Ready Soon FOR EVERY DEALER INTERESTED IN GREATER SALES AND PROFITS!

KOL-MASTER CORP., OREGON, ILLINOIS



A NEW DE LUXE FAN by PEERLESS

Another big fan season is almost here. Get behind the new Peerless De Luxe for an active profit-building leader. Furnished in 18, 24, or 30 inch sizes with either one, two, or three speeds. The Peerless De Luxe is a slow speed, extremely quiet, wide blade, low velocity fan, embodying the very finest in modern fan design.

Write today for your copy of "Better Ventilation"—a 12 page bulletin just off the press. It gives complete information with illustrations, dimensions, capacities and prices on Peerless Exhaust Fans, Wall and Attic Ventilators, and Utility Blowers.

The Peerless Electric Company

1401 West Market Street, Warren, Ohio

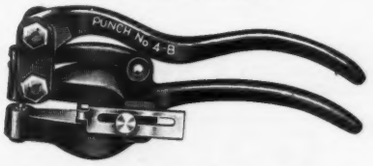
WHITNEY LEVER PUNCHES

No. 2 PUNCH



Length 23". Capacity $\frac{5}{16}$" through $\frac{1}{4}$" iron, weight 13 lbs., depth of throat $1\frac{1}{16}$". Punches and dies $\frac{3}{32}$" to $\frac{1}{2}$" by $\frac{1}{64}$".

No. 4-B PUNCH



This punch for sheet metal work has a capacity of $\frac{1}{4}$-in. through 16 gauge. Weight 3 lbs. Length $8\frac{1}{2}$-in. Depth of throat 2-in. Complete tool includes three punches and three dies of specified sizes with die adjusting key.

W. A. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

FURNACE • STOVE
and BOILER
REPAIR PARTS
Over 15,000 Patterns
We Sell Jobbers and Distributors Only
HOMER FURNACE & FOUNDRY CORP.
COLDWATER - - MICHIGAN, U. S. A.

EASILY WORKED

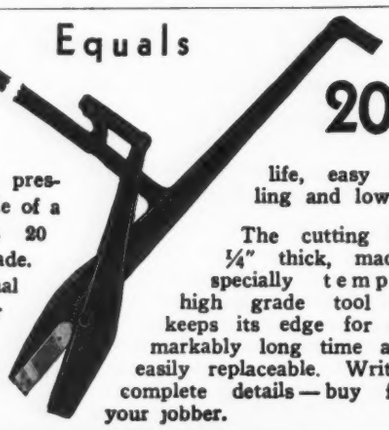


This remarkable corrosion-resisting sheet metal has an amazing tensile strength because of its extremely close grain and uniformity of texture. Does not flake or peel when being quickly formed into intricate shapes. Ask for details!

LYON, CONKLIN & CO., Inc.
Baltimore, Maryland

Lyonore Metal
CHROMIUM - NICKEL - COPPER - IRON ALLOY

Equals
1 lb. 20 lbs.

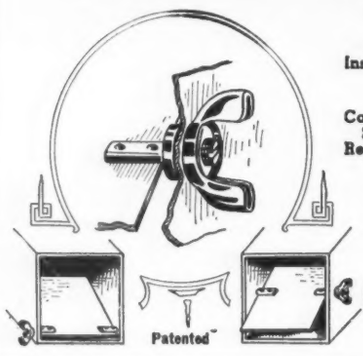


Every pound of pressure on the handle of a Viking produces 20 pounds at the blade. Viking's original compound lever arrangement does it. Choose a Viking for its strength, long life, easy handling and low cost.

The cutting blade, ¼" thick, made of specially tempered high grade tool steel, keeps its edge for a remarkably long time and is easily replaceable. Write for complete details — buy from your jobber.

VIKING SHEAR CO. ERIE, PA.

THE GOESE TIME SAVER
DAMPER CONTROL



Positive—Simplified
•
Less Labor to Install
Insures Tight Vibration-less Job
•
Can be Used on either Flat, Square or Round Pipes
Regular or Splitter Dampers
•
Screw Slot on Threaded Stud Shows Position of Damper.
Finished in Cadmium.
Ask your Jobber.

Goese Mfg. Co.
2548 N. 18th Street
Milwaukee, Wis.

News Items . . . . . .

Stainless Steel Tests

A special committee of Committee A-10 of the American Society for Testing Materials, 260 South Broad Street, Philadelphia, Pa., reported during Committee Week in Rochester, March 7 to 11, the completion of inspections of the stainless steel installations on the exteriors of the Chrysler and Empire State Buildings in New York City. The information obtained will be supplemented by inspections of other installations of stainless steel on buildings of smaller size. Following completion of these inspections, the behavior of the corrosion-resisting steels under conditions of actual service installations will be correlated with the previous manufacturing history of the materials, and the results of these surveys when completed should be of considerable interest and assistance to the architectural and engineering professions, in connection with future building construction.

◆

Research Program

At the meeting of the Research Advisory Committee during the January convention of the National Warm Air Heating and Air Conditioning Association in New York City, Professor S. Konzo stated:

Status of Present Research Program

a. The apparatus for study of radiation effect on thermostats has been installed in the Residence, although no tests have been made up to the present time.

b. A minor study on register locations, in which a three-way deflecting register was installed at the baseboard and at the high sidewall, has been in progress.

c. The apparatus for the study of the frictional losses through different types of register faces has been installed in the Laboratory.

d. In the Residence the basic tests with a hand-fired coal plant have been practically completed. A smoke-indicating instrument has been installed and readings on the smoke density are being made.

e. Additional tests with a special down-draft converter unit have been made. Before any publication is made of the results obtained with the unit the data are to be submitted to the Advisory Committee.

f. The installation of the mechanical stoker in the warm air furnace will probably be made in early February. The preliminary tests will be made with some predetermined firing rate and with some standard method of control.

In general a program has been outlined which is sufficient for the next two winters.

Items for Future Study

The Committee investigated the feasibility of including the following items in the program for future investigations.

a. *Insulation of house.* The opinion of the Committee was that the Residence should be insulated as soon as feasible. Professor Kratz was of the opinion that the matter should await the completion of the stoker program. The possibility of using an insulation which will provide an over-all heat transmission coefficient of approximately 0.065 Btu. per sq. ft. per deg. F. was also considered.

Mr. Gulick was appointed to enter into preliminary negotiations with the insulation manufacturers in regards to possible cooperative efforts.

b. *Return air.* The effect of the return air register on the air distribution in a room could be investigated by a study of the following nature made in any given room:

1. Temperature gradient, distribution and air currents to be investigated with doors open and no returns from the room.
2. Same with doors closed.
3. Same with doors closed and cracks sealed.
4. Same with return air registers used in the room.

The Committee approved this item for conclusion in the program to be investigated both before and after the house is insulated.

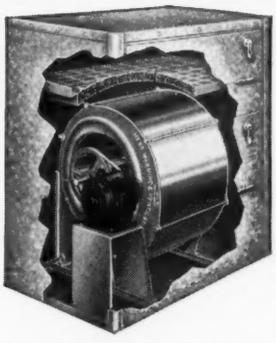
c. *Floor Panel Heating.* The Committee approved the suggestion to try a floor panel heating system in the sun room using a plenum box under the floor. The question of the drying effect of the heat on the floors was to be kept in mind.

d. *Slot-Type Register.* The Committee also approved the suggestion of determining the performance characteristics obtained with a slot-type register located near the floor.

e. *Extended Plenum.* This proposal was considered as sufficiently interesting to retain on the program, although no change in the duct system was contemplated until after the house is insulated.

f. *Humidity Problems.* After much discussion no direct method of attack on the humidity problem could be outlined. No objections were offered to the staff using several different types of humidifiers and obtaining incidental data on evaporation rates, evaporation requirements, and possible methods of eliminating lime deposits.

QUALITY EQUIPMENT-- FROM HESS-- COSTS LESS



HESS
BLOWER FILTER UNIT

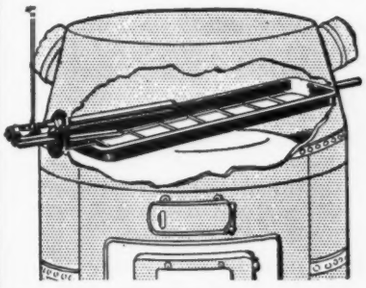
is priced low and comes completely factory assembled ready for connection to any furnace. It has two large hinged doors for easy access and many other quality features.

HESS WELDED STEEL FURNACES, BENEFACTOR STEEL FURNACES, HESS OIL BURNERS, COAL STOKERS

Fill every dealer need for high quality at the lowest prices. HESS FHA terms give the dealer full payment on installment sales.

WRITE FOR DEALER PORTFOLIO
HESS WARMING & VENTILATING CO.
1211-27 S. WESTERN AVE. Founded 1873
CHICAGO, ILLINOIS

Ample Capacity for all Warm Air Heating Conditions



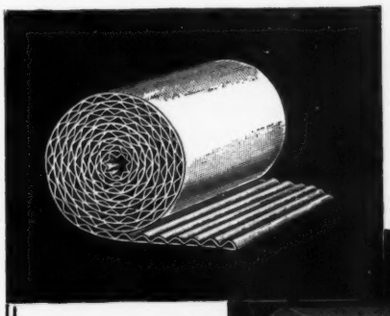
. . . but the heat - control principle of THERMO-DRIP Humidifier prevents any excessive moisture.

Sandard models for any type or make of warm air furnace. Also models designed especially for plenum chambers — all with STAINLESS STEEL Pans . . . more for your money!

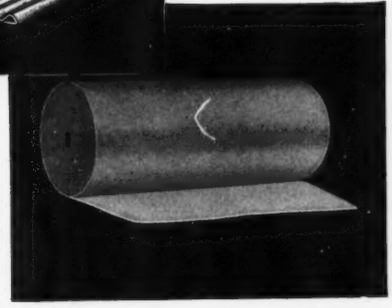
Yes . . . any installation of a THERMO-DRIP Humidifier gives the homeowner air moistening capacity to spare. But that doesn't mean oversaturated indoor atmospheres. The water valve opens and closes as bonnet temperature rises or drops. You'll sell more humidifiers when you present THERMO-DRIP's powerful selling features. Try it!

AUTOMATIC HUMIDIFIER CO.
18th and Main Streets CEDAR FALLS, IOWA

SAL-MO Asbestos Insulation Curbs HEAT LOSS in Warm Air Furnace Installations . . . Assures More Efficient Operation.



(Left) SAL-MO Asbestos Aircell Paper



SAL-MO Asbestos Paper and Rollboard

BE sure that your Warm Air Furnace installations do not have that 30% heat loss that is usual with uninsulated pipes. When you use SAL-MO Asbestos Papers and Millboards you are sure of a perfect job and perfect insulation. SAL-MO Asbestos Products are of uniform high quality, manufactured from the best grade of Canadian asbestos fibre.
Other SAL-MO Products include Pipe Joint Tape, Furnace Cement, Fireboard and coverings for all types of High and Low Pressure Pipe Lines.

SALL MOUNTAIN COMPANY
176 West Adams St. CHICAGO, ILL.

Find Your Santa Claus In Every Chimney This Summer . . .

● Chimney cleaning is the big new market to the man who can clean chimneys quickly, economically, yet not fill the house and neighborhood with soot and dirt. Four out of five chimneys need it, and will pay you well for it. The Super alone comes complete with special proper tools for cleaning chimneys from the basement, no roof work, no fuss, no muss. Then you get other orders — repairs, new parts, new plants. Make us prove that. Accept our 5-day free trial offer. All risk to the Super is ours. See for yourself how every chimney means profits for the shop with a Super.



USE THIS COUPON

The National Super Service Company
1944 N. 13th Street, Toledo, Ohio
Send me the Plan Book and complete information about your free trial and the new low-priced Super.

Name .....

Street Address .....

City and State .....

Gray's Full Size Blueprint Patterns

JUST OUT—45 degree branch patterns in two sets.

Set No. 3— 2" to 12" branches on 2" to 30" diameter.
Set No. 4—12" to 24" branches on 12" to 48" diameter.
385 patterns in the two sets.

ELBOW PATTERNS.

Set No. 1—1" to 20" 2-3-4-5-6-7 piece, including Tee patterns 2" to 20" diameter.
Set No. 2—20" to 40" 5-6-7-8-9 piece and angle chart showing what pattern and number of pieces to get required angle.

SKYLIGHTS.

Hip, gable and single pitch, putty bar } with square ridge vent and
Hip, gable and single pitch, puttyless } base patterns.
Turret lights to operate by gearing.
Louvers—stationary and to operate.
Roof ventilators and base patterns.
Ship ventilators—6 piece 4" to 24" at base.
Molded gutter miters 3" to 10" wide.

G. L. GRAY, 507-511 GRAND AVENUE, NEW HAVEN, CONN.

Write for pattern circular giving full information. Mention American Artisan.

MARSHALLTOWN SHEARS

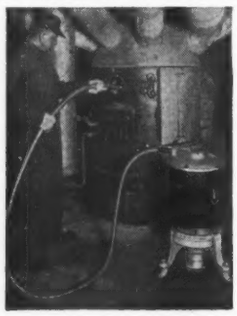


The handiest tool in the shop—the No. 18H Rotary Shear quickly and efficiently cuts odd shapes as well as straight splitting of 18 gauge material or lighter. Handles sheets of any dimensions.

Write today for special Throatless Shear Bulletin.

A size for every need—from 18 gauge to ½" capacity.

MARSHALLTOWN MFG. COMPANY
920 E. Nevada Marshalltown, Iowa



A BIG AID TO SPRING BUSINESS REVIVAL

Only a small investment required. Make more business for your shop from cleaning jobs which open up repair jobs and new sales.

THE PRODUCTIVE, ECONOMICAL KENT DOUBLE SUCTION IS THE MACHINE YOU NEED TO DO IT!

Write TODAY for all details.

THE KENT COMPANY, Inc.
167 Canal St. Rome, N. Y.

CONGRESS PULLEYS



Congress Pulleys are ideal for installation on stokers and blowers. They perform for years without service and insure the contractor against repeated call-backs due to pulley failure. Write today for literature. The line is complete and priced right.

Congress Tool & Die Company
9034 Lumpkin Avenue Detroit, Michigan

News Items . . . . . .

Air Conditioning Legislation

An amendment to the city's plumbing ordinance requiring connections of air conditioning units to be brought under jurisdiction of the city plumbing inspector is being considered by the Jackson, Mich., city commission.

The amendment would give the inspector right to inspect connections and enable the city to charge an inspection fee, besides providing for the method of disposing of waste water. It was recommended by the city plumbing inspection board.

◆

Glass Lets in Sun, No Heat

Combining the features of glass block and double glazing, Thermolux, a translucent glass developed in Italy, transmits sunlight minus sunheat. Its structure consists of a central lamina of spun silk threads regularly arranged, held between two sheets of clear glass. Edges of this porous layer are hermetically sealed so that the air it contains is not disturbed. The construction is such that the visible wave lengths of the spectrum are not distorted. According to "Glass Digest," this new material is soon to be manufactured in the United States and will be sold and installed through regular glass outlets.

◆

Kinsner in Larger Quarters

Kinsner Supply Company succeeds J. Kinsner & Son Company, a sheet metal and furnace jobbing house actively engaged in the business in Cleveland at 8710 Blaine Avenue, for over 20 years.

The firm will be headed by Arthur J. Kinsner, President; James F. Klein, Vice-President; and Russell B. Dickson, Secretary-Treasurer.

With the formation of the new company, much larger quarters were taken over at 1614 East 40th St. About 32,000 feet of floor space will be occupied, part of which is probably one of the finest display rooms to be found in the State of Ohio.

The Kinsner Supply Company expect to expand their lines on a strictly wholesale basis.

◆

Buyer Analysis

The Nebraska Power Company, Electric Building, Omaha, Neb., has compiled a set of analysis sheets for the use of air conditioning buyers.

This material consists of several sets of single-line sheets and a group of five-line master sheets, all of which are given to a buyer. He asks the prospective dealer to fill in the single-line sheets, which, in turn, will be copied on the master sheets. This provides the customer with a brief yet quite complete analysis so arranged as to facilitate such comparison as will be necessary to intelligent selection.

This is an attempt to help the customer in analyzing his proposals and making his decisions and, at the same time, not in any way influence him.

New Plants and Additions . .

The Milwaukee Metal Spinning Co. has begun erection of an addition to its factory at 1325 S. 43rd street, West Milwaukee, Wis., to cost about $5,000.

◆

The Garden City Fan Ventilator Co. plans a factory building at Niles, Mich., to cost about $60,000.

◆

Matt L. Van Lannen, of the Northern Metal & Roofing Co., 1005 South Main street, Green Bay, Wis., is about to erect a warehouse corner Webster and Cedar streets.

◆

Combustion Engineering Company at Chattanooga, Tenn., is undertaking two expansion projects calling for a total expenditure of $49,500. A brick and sheet metal shop is being constructed at a cost of $45,000, and an addition to its present shop now under construction will cost $4,500.

JOHNSON
SETS A STANDARD IN OIL BURNERS
with the new
"BANKHEAT" PRESSURE TYPE



"BANKHEAT" Pressure Type Johnson Oil Burner

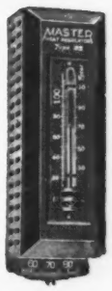
... compact, efficient... and built for years of service. Automatically shuts off when the required temperatures are reached. As burner stops, counterbalanced draft shutter closes, preventing passage of cold air through boiler, conserving fuel & lengthening life of furnace.

S. T. JOHNSON CO.
940 ARLINGTON, OAKLAND, CALIFORNIA
401 N. BROAD STREET, PHILADELPHIA, PA.

THERE'S A JOHNSON FUEL OIL BURNER FOR EVERY PURPOSE

DEPENDABILITY

No Master product is ever made available until its accuracy and dependability have been completely proven. The model B-22 has proven its dependability not only in our exhaustive tests, but in use under actual operating conditions in the many years it has been sold and installed all over the country.



TYPE B-22



A two position heat regulator that is ideal for the small home. It is sturdily made and dependability and precision are built right into it. A noiseless device that will outlast the heating plant.

WHITE MFG. CO.
2362 University Ave.
St. Paul, Minn.

MASTER
HEAT REGULATOR

JUST OFF THE PRESS

HAVE YOU RECEIVED YOUR COPY?

WRITE

The New Rock Island Register Catalogue Shows Complete Line of "No-Streak" Registers for Gravity and Forced Air Installations.

Also many helpful Charts, Tables, Estimating Data—Prices. A catalogue every Dealer should have. Send for your copy today.



ROCK ISLAND REGISTER CO.
ROCK ISLAND ILLINOIS

This NEW TYPE OF CRAFTSMAN
CAN BE YOUR BEST SALESMAN!

Quality equipment properly installed and correctly serviced is a winning combination you can always depend on to bring that satisfied customer's recommendation so valuable to every business. You've *always* been able to control the quality of your equipment; and NOW *you can control the quality* of your installation and service work.

More than 100 leading manufacturers are officially endorsing and recommending the Training Program being conducted by the Refrigeration & Air Conditioning Institute under the direction and supervision of factory engineers, working right in the industry, so as to provide you with a source of dependable, highly skilled refrigeration and air conditioning service engineers. This *New Type* of *Craftsman*, created especially for the Refrigeration and Air Conditioning Industry is, in a way, a composite of all the crafts employed in air conditioning work insofar as they are used in Air Conditioning installations. He can help you increase your net profits in three ways:—first, Eliminates the need for costly training; second, Reduce your service expense; third, Helps to develop new business through satisfied customers. He is then, a man who can become a definite asset to your business from the first day his name is added to your payroll.

The individual qualifications of each man trained by the Refrigeration & Air Conditioning Institute is recorded in a form which enables you to select, at a glance, the man best suited to your needs. . . . Mr. Employer, will you let us shoulder your *Training Costs* and help you solve your man-power problem?

MORE THAN 100 LEADING MANUFACTURERS "OFFICIALLY" ENDORSE AND RECOMMEND THIS TRAINING PROGRAM

Ray F. Smith
PRESIDENT

REFRIGERATION & AIR CONDITIONING INSTITUTE
Division of the Industrial Training Corporation
2130-2158 Lawrence Avenue • CHICAGO, ILLINOIS

New Literature . . . .

For your convenience in obtaining copies of new literature, use the coupon on page 102.

175—Bulletin KL

Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y., is distributing Bulletin KL illustrating and describing Niagara Series KL Power Squaring Shears which are added to the Niagara line.

176—A. G. A. E. M.

Association of Gas Appliance and Equipment Manufacturers, 60 East 42nd St., New York City, is distributing the A. G. A. E. M. Bulletin. The object of this association is to promote the use of gas as a fuel.

177—Cool Comfort Within Doors

Viking Air Conditioning Corp., Main & Center Sts., Cleveland, Ohio, is distributing Bulletin No. 69, with space for dealer imprint, entitled "Cool Comfort and Summer Enjoyment." The CirCOOLator is described and there are testimonials.

Bulletin No. 70, dated March 1, is a price list—data sheet—selector chart.

178—Install Copper Roofing

The American Brass Company, 414 Meadow St., Waterbury, Conn., is announcing the publication of a handbook entitled "Suggestions for Installing Anaconda Economy Copper Roofing," a 72-page spirally-bound manual of construction details based on the methods followed by experienced sheet metal roofing contractors. There are 65 pages of two-color drawings by Vahan Hagopian, A. I. A., illustrating progressively each step in the building of a watertight, standing seam 10-oz. Anaconda Copper Roof. Suggested specifications are included.

179—Welding and Cutting

The Linde Air Products Company, 30 E. 42nd Street, New York City, is distributing a small booklet containing the addresses of distribution, sales and service facilities. The addresses are geographically arranged. There is also a complete list of their products.

180—New G. E. Literature

General Electric Company Schenectady, N. Y., is distributing three new pieces of literature:

Bulletin GEA-2791 covers the new thyratron spot-welder control; Bulletin GEA-2627, motors for belt-driven blowers on air conditioners; and GEA-2704, the full line of arc-welding accessories.

181—Compensating Thermostat

Detroit Lubricator Company, Div. of American Radiator & Standard Sanitary Corporation, 5900 Trumbull Ave., Detroit, is distributing condensed catalog No. 100, including list prices, covering "Genuine Detroit" automatic controls and equipment for lubrication and all types of heating, refrigeration and air conditioning.

182—Contour Machining Handbook

Continental Machine Specialties, Inc., 1301 Washington Avenue South, Minneapolis, has just published "The Contour Machining Handbook," a revised and enlarged edition of the earlier handbook on contour sawing.

Tables for the correct machining speeds for either sawing or filing 48 materials are given. These materials range from plastics to SAE 1090 and high chrome high carbon steel.

INDEPENDENT "Fabrikated" REG U S PAT OFF

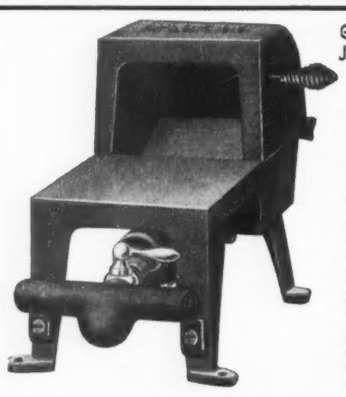
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DIRECTED AIR FLOW

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Each grille bar can be set individually to direct air flows right or left or up or down, either at the time of installing, or after the system is in operation.

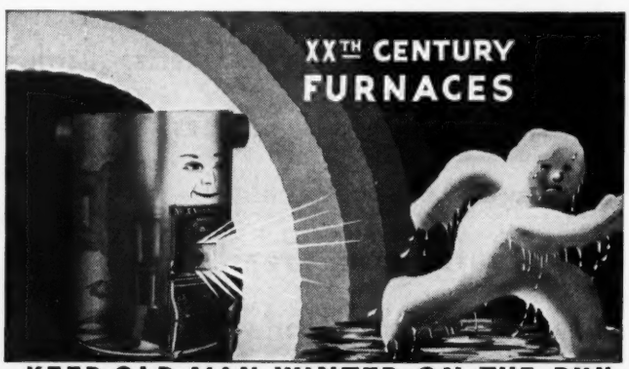
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3747 E. 93rd ST., CLEVELAND, OHIO



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Here's the ideal Furnace for sheet metal work because it is compact, highly efficient, speedy and economical to operate. No forced air blast or blower required because Johnson Direct Jet Burner principle assures complete combustion at proper velocity. Patented curved shaped hood forces a return blast over tops of irons. Heats soldering coppers up to 6 lbs. per pair. Heat-treating of small parts and metal melting can be successfully done. The hood is hinged and can be instantly removed. The No. 501 is only one unit from the complete Johnson line of industrial metal working gas appliances and home-heating burners. Write for free catalog. Order at once.

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Cedar Rapids IOWA



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XX TH CENTURY HEATING & VENTILATING CO.
AKRON, OHIO

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Furblo Cabinet Units

With New Sectional Construction and New Dual Mounting of Motors



Furblo Prices Are Low!

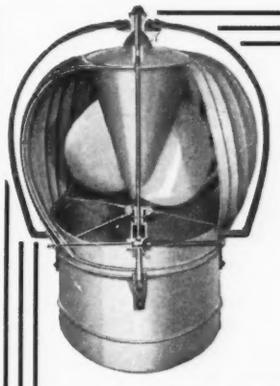
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Gives You Most for Your Money

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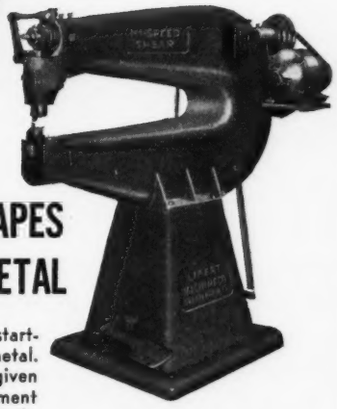
When installing ventilation equipment, you must be sure the job is permanent, durable, dependable. That means ALLEN Turbine Ventilators will fill your need. The precision manufacture, highest quality engineering and materials back of the ALLEN line, assure you that your customers will be thoroughly and permanently satisfied.

Allen Turbine Ventilators are made in a complete line to suit every ventilating job. Our free literature describing each type, with specifications, is yours for the asking.

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ALLEN TURBINE VENTILATORS

HIGH *Speed* SHEARS



FOR CUTTING IRREGULAR SHAPES FROM SHEET METAL

Inside cutting without starting holes or removing metal. Stop the cut at any given point. Standard equipment furnished for ring and circle cutting . . . absolutely accurate and easily operated . . . metal is sheared and not punched . . . only one adjustment for various thicknesses of material used . . . unobstructed cutting vision . . . no further finishing required. No special cutters, pilots, templates, or strippers are needed . . . long life shear blades. Write for complete information.

LIBERT MACHINE COMPANY, Green Bay, Wisconsin

Manufacturers of shears since 1915

Libert Hi-Speed SHEAR



PREMIER FURNACE CLEANERS
COMPLETELY EQUIPPED

HALF HORSE POWER MODELS
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ONE HORSE POWER MODELS
84.50 and 89.50

Premier Furnace Cleaners are powerful and light weight, yet sturdily built to stand years of rugged service. Weighing less than 50 pounds, they are one-man cleaners and have been the furnace man's favorite for years. Premier Cleaners are ideal for upstairs use and may be used independently from the container for suction and blowing use in cleaning air ducts, registers, grills, radiators and air conditioning equipment.

Motor specifications for these powerful cleaners are:

½ H.P. maximum vacuum 31 inches in water.
1 H.P. maximum vacuum 46 inches in water.

Business-Getting, Return Post Cards are Available for Dealers at Low Cost

Buy It From Your Local Jobber or Write the Manufacturer

Furnace Cleaning Instruction Booklet Free with Each Cleaner

ELECTRIC VACUUM CLEANER CO., INC.
1734 Ivanhoe Road · Cleveland, Ohio

New Literature . . . .

For your convenience in obtaining copies of new Literature, use the coupon on page 102.

183—New Price List

F. Meyer and Bro. Company, Peoria, Illinois, are announcing a new lower price list on duct-work. A postal card or letterhead request will get a copy.

184—Registers and Grilles

Register & Grille Mfg. Co., Incorporated, 70 Berry St., Brooklyn, is distributing a new catalog which they say is a complete and thorough treatise on all register and grille matter.

185—Rotary Hack Saw

Misener Mfg. Co., Inc., Syracuse, N. Y., is distributing a four-page folder showing their rotary hack saw in both group and single cut models in a wide range of sizes in Type B for hand use and Type P for power.

186—U. S. S. Storm Seal

United States Steel Corporation subsidiaries, 434 Fifth Avenue, Pittsburgh, has just issued a new four-page folder, printed in blue and black, featuring the new U.S.S. Storm-Seal Galvanized Roofing.

Enlivened by cartoon illustrations, the new folder tells the five reasons why U.S.S. StormSeal is a leakproof roofing. Economies of this galvanized roofing design are also explained, with full instructions provided for applying StormSeal.

Other new roofings, U.S.S. SyphonSeal 1¼-in. Corrugated and U.S.S. SyphonSeal 2 and 3 V-Crimp Roofing, are depicted on the back page of the folder, where are shown the most popular roofing accessories for StormSeal and SyphonSeal.

187—The Mighty Midget

Marshalltown Manufacturing Company, Marshalltown, Iowa, is distributing an envelope stuffer with space for dealer imprint illustrating and describing the Mighty Midget bench press. Features of design of this press are heavier construction, more die space, improved ball and socket connection and easier adjustment. The press is equipped with an improved convertible clutch which provides either single stroke or continuous operation. Individual V belt motor or lineshaft drive is available.

188—A. C. Registers

Eckenroth Register Company, Inc., 447 Sutter St., San Francisco, California, is distributing catalog D-4 illustrating their new and improved "All Season" combination air conditioning registers.

In summer for cooling position the register opens out from the wall and the individual adjustable grille bars direct the cool air upward at an angle of approximately 85 deg. to the ceiling. In the closed or heating position with the valve or wafer open, the grille bars firmly set at a downward angle of 22 deg. direct the warm air down and across the floor.

189—Exhaust and Ventilating Fans

The Emerson Electric Manufacturing Company, St. Louis, Missouri, announces a new catalog titled "Emerson-Electric Exhaust Fans—Ventilating Fans." This 16-page catalog illustrates and describes Emerson-Electric exhaust fans, shutters and protective mesh guards, kitchen ventilating equipment and Emerson-Seabreeze kitchen ventilators. Where and how to install exhaust and ventilating fans for maximum benefits, how to determine the most effective size of fans to use, and other important phases of modern ventilation are discussed.

A complete new line of Emerson-Electric single-speed, sleeve bearing exhaust fans are featured and fully described. Dimensions, performance, and prices are included.

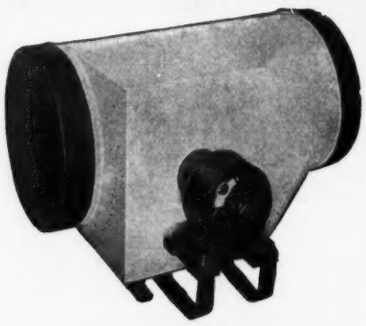
A Heat Hustler Fan Forces Air Through a Single Warm Air Pipe

Heat garages, sun porches and other rooms that will not heat by gravity. Mounts directly in the warm air pipe. Draws heat from the furnace and forces it into the hard-to-heat room. Quick heat for a bathroom.

Four reasons why you should use the American Heat Hustler:

1. It uses a positive pressure, rotary type fan.
2. Motor is outside the warm air flow, adding greatly to life of motor and leaving as much space for gravity air flow as before the Heat Hustler was installed.
3. It is quiet.
4. Furnished for either automatic or manual control.

Price list, with descriptive literature showing different models, sizes, etc., will be sent you by return mail upon receipt of your request. CLIP AND SEND THIS AD IN NOW!



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CLIMATEMAKER CORPORATION of Tennessee

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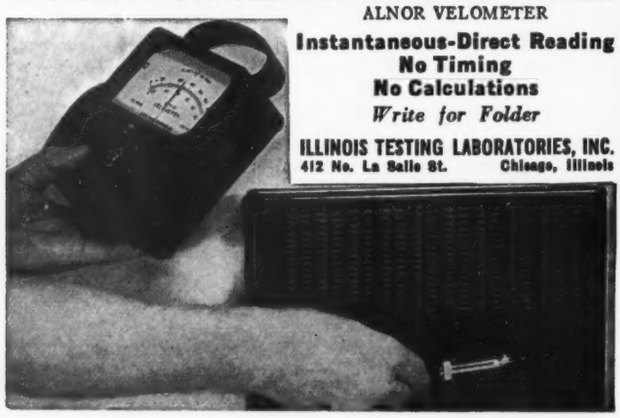
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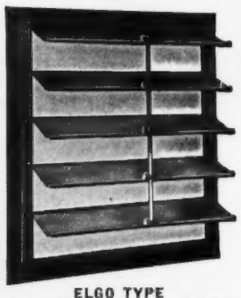
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Instantaneous-Direct Reading
No Timing
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Get our prices on your requirements in Automatic Shutters, Stationary Shutters, Stack Dampers and Back Draft Dampers.

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New Shutter Features

(1) Louvres weatherstripped on inner edge, instead of on outer edge, making shutters open more easily and fit more snugly. Tightest fitting shutter on the market.

(2) Swivel-joint with hardened steel bushing. No wear or rattle. Good for the life of the shutter.

More sensitive than any other automatic shutter, and longer lasting. Built to any size, square or rectangular. Write for details and prices.

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Complete range of sizes

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Better Service from

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Temperature Controls

Precision built, more sensitive, more dependable, G-A temperature controls are recommended everywhere by contractors and heating engineers.

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And MORE PROFIT for you, too! Get the facts. See your jobber or write today for full details.

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How to Sell Furnaces and Repairs



WITH

The TORNADO Furnace Cleaner

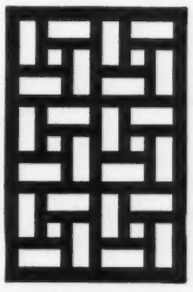
The TORNADO gets you into the basement where it is easy to sell repairs and new furnaces. And you make a profit on the cleaning job too!

Dealers say that the TORNADO is the most powerful furnace cleaner built. Leads the field! Low price—easy payments—free trial. Approved by Anthracite Institute and Underwriters Lab. Thousands in use.

Write now for complete information.

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Tile Cane Design R-17 With 52 Per Cent Open Area

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Furnished in No. 20, No. 22 U. S. S. Ga. in Standard Size Sheets from Stock.

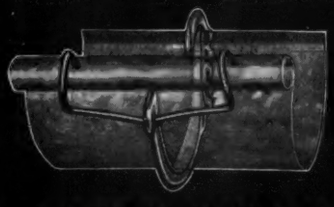
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Saves time and labor

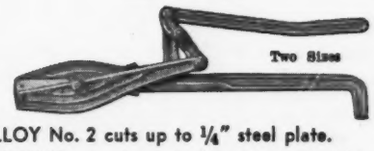
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Furnished only with "BB" Circles at no extra charge over old style straps.

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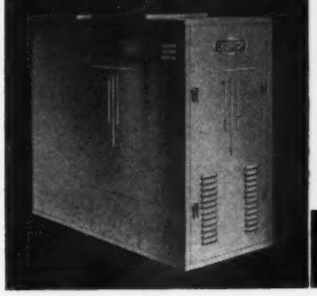
ALL-ALLOY No. 2 cuts up to ¼" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.
Special blades may be had for shearing stainless steel.

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85%
OVERALL EFFICIENCY
CENTURY ENGINEERING CORP.
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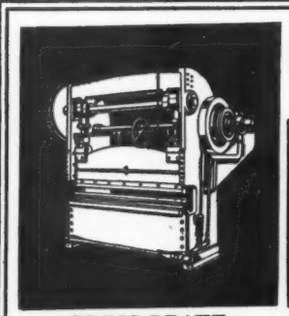


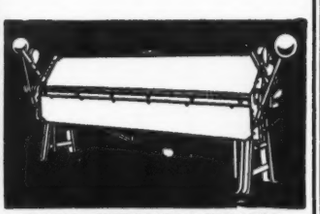
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Steel Brakes—Presses—Shears

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NuDRY FURNACE CEMENT BEST BY TEST

- Withstands more heat.
- DOES NOT CRACK OR POWDER WHEN FURNACE IS FIRED IMMEDIATELY.
- Will not shrink, keeps joints tight at all times.
- Comes in dry form, requires only 5½ lbs. where ordinarily 10 lbs. is used.
- Send for free 5½ lb. sample.

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THE GRAND RAPIDS FURNACE CLEANER

Powerful—One-Man Portable Sturdy

The first Grand Rapids Furnace Cleaners put out years ago are still in use. Dealers say they are the best with no wear out to them.

Free Trial—Convenient Terms Write for Details



GRAND RAPIDS FURNACE CLEANER CO. 225 STEVENS ST., S. W. GRAND RAPIDS, MICHIGAN

New Literature . . . .

For your convenience in obtaining copies of new Literature, use the coupon on this page.

190—Offers Finance Plan

International Heater Company, Utica, New York, announces a finance plan with the new low 5 percent discount rate. Special features are: Without recourse on dealer; no down payment required; maximum terms—36 months; monthly payment as low as $5.00.

A new price list effective March 1 is also available.

◆

191—New Furblo Cabinet

Furblo Company, Hermansville, Michigan, is distributing Catalog Form 8-2—"Furblo Cabinet Units, Fairweather Units, and blowers for air conditioning." This catalog lists the new series of cabinet units, as well as the 100/200 Series, Furblo Type K and Fairweather units. It is a complete catalog. Copies are available.

◆

192—1938 Catalog

The Van Dorn Electric Tool Co., Towson, Maryland, is distributing the new 1938 Van Dorn complete line catalog. New tools described therein are: shorty drill, utility power drills, lectro-shears, tapper, right angle adj. screw drivers, right angle adj. nut runner, No. 43 nut runner, 7 and 10-in. and trim saws, No. 7 and 12 portable grinders, 2 and 2½ in. portable grinders, 2 speed sanders, 7-in. combination sander-polisher, and lectro-kleen process.

Improvement in design and construction have been incorporated into a number of the old line tools, contributing to their greater flexibility, increased efficiency and longer life.

◆

193—Sample Card

Ward Machinery Company, 564 W. Washington Blvd., Chicago, is distributing a sample card with three actual random samples made on the Almar corner lock forming machine.

The Almar Junior has a 24-gauge capacity, the Almar Standard a 20-gauge capacity, and the Almar Heavy Duty a 6-gauge capacity, with ¼, 5/16 and ⅜-in. recess in lock respectively.

Seven essential points in a machine-made Pittsburgh or corner lock are: 1—No fracture in metal with perfect offset; 2—Uniform double thickness; 3—No loop in metal, tightly closed: 4—Snug fit to receive flange; 5—Adjustable hammer-over-edge; 6—Uniform recess, ample depth; and 7—Seam perfectly true, tightly closed.

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American Artisan, 6 N. Michigan Ave., Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

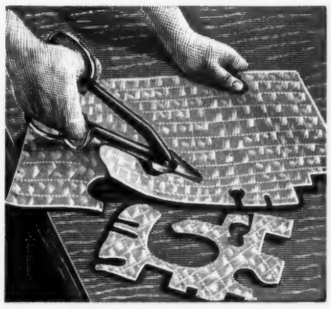
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175	176	177	178	179	180	181
182	183	184	185	186	187	188
189	190	191	192	193		

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SCROLL-PIVOTER SNIP

Cuts circles, scrolls and squares as easily as a straight line. Will cut alloy metals.

Now furnished with serrated blade unless otherwise ordered.

Use Wiss Hy-power and Bulldog Snips

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Established 1848 Newark, N. J.

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Special Sheets & Other Products for the Sheet Metal Worker In stock for Immediate Shipment

Sheets: Panel and Sign Galvannealed Copper Alloy Blue Annealed Heavy Hot Rolled Stainless, etc.
Structurals Angles Tees, Zees Hoops, Bands Bars, Plates Tubing Bolts, Nuts Welding Rod, etc.
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Ryerson Certified Steels represent the highest quality obtainable in each class and type of material. Stocks include more than 25 kinds of sheets and all other steel products for the sheet metal worker. Special quality and service features help users to secure best results. When you need good steel, a single bar or a carload, phone, wire or write the nearest Ryerson plant.

Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

Air Conditioning

—What happens between two rooms, one having a six minute air change, and the adjoining room a twelve minute air change?
—Can you install a thermostat control system properly?

The answers to these and hundreds of other mechanical questions about air conditioning are appearing in the monthly *Air Conditioning Section* of AMERICAN ARTISAN.

If you do not now get the ARTISAN, send us $2 and we will enter your subscription for a full year—12 consecutive issues. Your subscription will yield a rich harvest of money making ideas and solutions to many mechanical problems connected with warm air heating and sheet metal contracting.

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Known for courteous service and genuine comfort, the Miami, smart and colorful, is the first choice in Dayton of experienced travelers. Large, livable rooms, tastefully furnished. Nationally famous for good food-and quality liquors in the Silver Forest and famous Crystal Bar.

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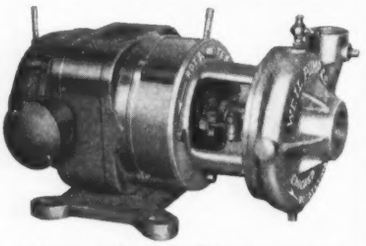
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AMERICAN ARTISAN *Service Section*

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Ask For Bulletin R-5500 Electropump

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are indispensable to the modern, up to date sheet metal shop. Light, portable, yet extremely strong, they will make your shearing operations much faster, neater and more economical thru time saved on the job. They are made in two sizes to handle up to 14 or 10 gauge metal and are very reasonably priced.

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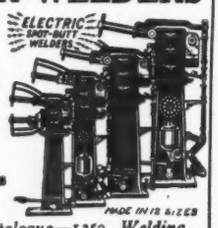
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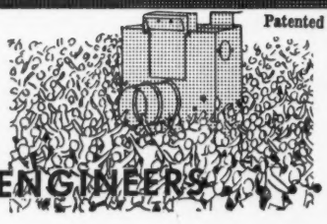
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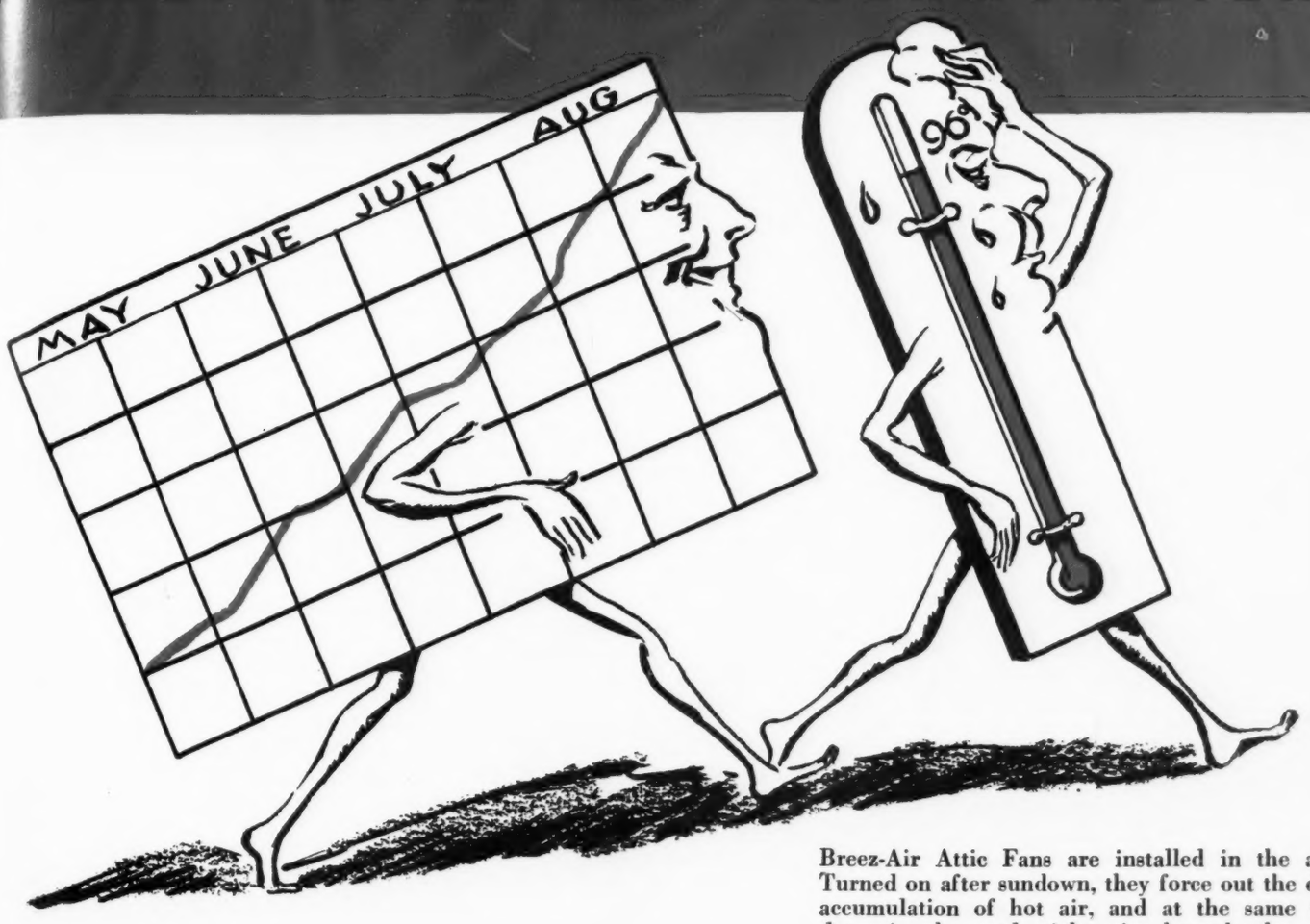
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Branch Engineering Offices in Principal Cities

In Canada: Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" BREEZ-AIR ATTIC FANS

for HOME COMFORT COOLING



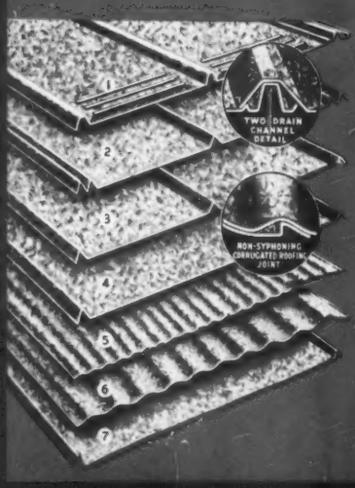
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MILCOR Line of Metal Roofing



MILCOR Roll Roofing
Detail of Double Cross Lock

Available in several styles and weights, all double cross locked, notched and resquared on sides and ends, offering dependable protection against water seepage.



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6—2½" Corrugated Roofing
7—Pressed Standing Seam Roofing

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- *Buy from Sheet Metal Headquarters*
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- *Five Plants, conveniently located for prompt delivery*

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Roofs are laid quickly and smoothly with Milcor Roll Roofing, for it's resquared on sides and ends, notched, and fastened together with a tight, strong Double Cross Lock.

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G-16

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